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SPASTIC-ENTROPION CORRECTION BY ORBICULARIS TRANSPLANTATION*

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Many procedures have been suggested for the correction of spastic entropion of the lower eyelid. Most of them depend for their effectiveness on a downward pull, calculated to unroll the inverted lower lid, and, by downward traction, to prevent turning in of the margin. Such pull may be accomplished by the application of adhesive plaster, by the insertion of buried sutures, as suggested by Snellen, Gaillard, Arlt, and others, or by making skin excisions, as proposed by Celsus, von Graefe, Janson, Panas, and many other writers. Skin and subcutaneous-tissue contraction, effected by means of acid and by the application of the actual cautery, has been recommended, and the use of the cautery has been stimulated in recent years by Ziegler's advocacy of his method.[1]

Not quite all the procedures for correction of spastic entropion are dependent on methods that induce downward pull on the lower lid. For example, Pochisov[2] advises canthotomy and severance of the attachment of the outer part of the eyelid to the orbital margin. Goldzieher[3] and Blaskovics[4] removed a triangle of skin from the zygomatic region, and so made lateral traction on the skin of the lower eyelid. Alfred Vogt[5] suggested a free canthotomy and a readjustment of the flaps between the outer canthus and the orbital margin, so that during the healing process the lower flap is held forward slightly by the sutures. The result of the maneuver is that the outer part of the lower lid is held slightly away from the globe. In 1929 Valiere Vialeix[6] advocated excision of the upper part of the epitarsal orbicularis of the lower lid. In 1931 Hughes[7] described a technique for weakening the action of the orbicularis by the injection of 95-percent alcohol into the muscle near the outer canthus. The use of alcohol has been recommended by other observers. Weekers[8] found that entropion had recurred in some patients who had received alcohol injection into the lower lid, and hence he advised, for cases in which the condition had existed for some time, a combination of alcohol injection and canthotomy.

I have been unable to find any reference to an operation resembling the one I describe here, unless it be the procedure credited to Birch-Hirschfeld, which is illustrated in the volume on surgery of the eye just published by Blaskovics and Kreiker. In that operation orbicularis strips are dissected up and are tied by sutures that pass through the skin of the eyelid.[9]

In January, 1935, I first performed the following operation:

OPERATION

Anesthesia.—Infiltration of the opera-

*Presented at the Seventy-fourth Annual Meeting of the American Ophthalmological Society at San Francisco, California, June 9-11, 1938.

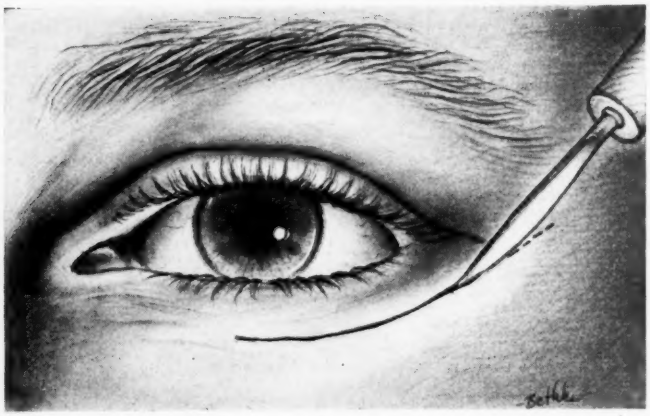

Fig. 1 (Wheeler). Skin incision. For the sake of clarity the lid margin is shown in normal position, instead of in entropion.

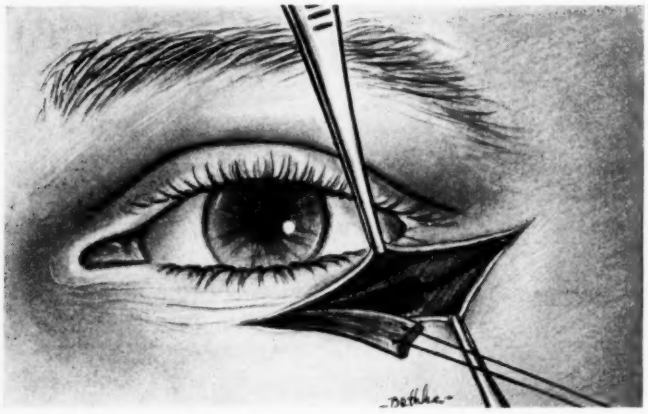

Fig. 2 (Wheeler). A strip of orbicularis muscle about 4 mm. wide is dissected and its free end is held by a suture. The nasal end of the strip is left attached a little below the tarsus. An incision in the orbicularis has been carried over the zygomatic (malar) bone.

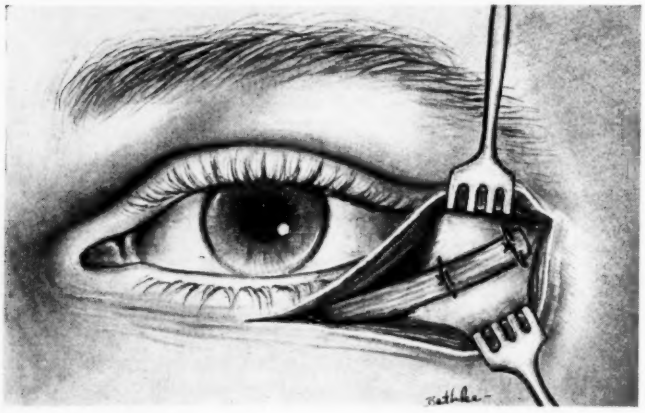

Fig. 3 (Wheeler). Skin and orbicularis flaps are retracted to expose the periosteum, and the strip of orbicularis is attached to the periosteum in its advanced position. The strip is taut.

tive field with a 1-percent solution of novocaine (with or without adrenalin) produces satisfactory anesthesia. The magnification of the tissues that results from infiltration, with increase of the tissue bulk, makes the dissection easier and enables the surgeon to work with greater accuracy than is possible without infiltration. The injection of fluid into the tissue in front of the tarsus and tarso-

orbital fascia eliminates the entropion, and leaves the lid in good position during the operation.

The primary skin incision is begun about 6 mm. from the lower lid margin, a little nasalward of the center of the eyelid, and is carried in the direction of the lid margin into the zygomatic (malar) region, about 1 cm. beyond the orbital margin (fig. 1). The skin is then dissected from the orbicularis above and below the incision.

A strip of orbicularis muscle about 4 mm. wide is dissected free just below the lower border of the tarsus, with a cut end at the outer orbital margin. This strip is left attached at its nasal end at a point a little beyond the center of the lower lid (fig. 2). Next the orbicularis is divided over the zygomatic (malar) bone by an incision passing outward and upward, and the orbicularis flaps are separated so as to expose the periosteum (fig. 3).

The strip of orbicularis is put on the stretch and attached to the periosteum. It is sutured to its new position by two 000-chromic-catgut sutures, as shown in figure 3. It should be observed that the end of the orbicularis-muscle strip is carried not only temporalward but also upward, and that the muscle strip is thoroughly taut. As the dissection is a little below the tarsus, and so is not attached to it, the lid margin is not pulled much out of place laterally, but the lower lid does receive support.

The skin wound is closed by fine silk sutures, either with interrupted ties or by means of a single subcutaneous suture. I like the security and accurate apposition given by the interrupted sutures, carried through the flaps very near their cut margins.

The eyelids are covered by a protective tissue, such as gutta-percha, with a thin smear of vaseline. A gauze dressing is applied, secured by adhesive plaster, and over this a snug bandage is placed. The dressing should be left on for from five to seven days. After this the skin sutures can be removed and the dressing reapplied, to be left in place for a day or two, by which time the skin wound will have healed, and the transplanted muscle strip be securely adherent to the periosteum.

The result of this procedure is permanent correction of the spastic entropion without appreciable scarring or other disfigurement. The lid is well supported by

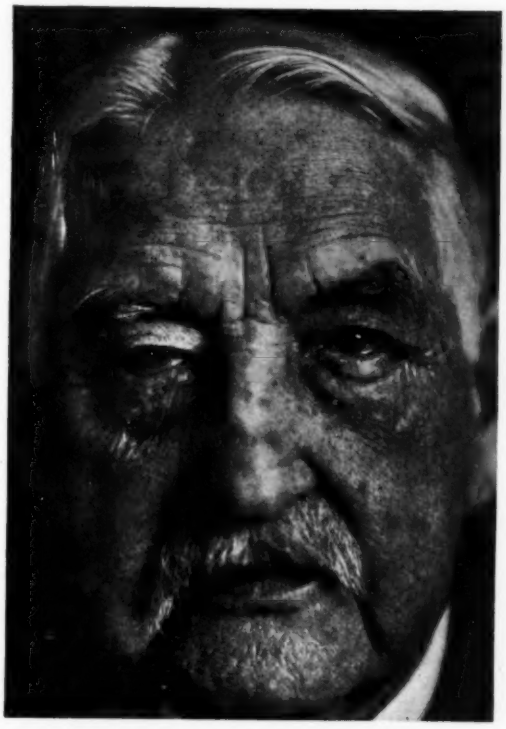

Fig. 4 (Wheeler). Photograph of a patient who had bilateral spastic entropion of the lower lids. The right lower lid was treated by excision of the skin with orbicularis and repeated cautery punctures. On the left lower lid the orbicularis-strip-advancement operation was performed. Note the lowered position of the right-lower-lid margin, and the normal position of the left-lower-lid margin.

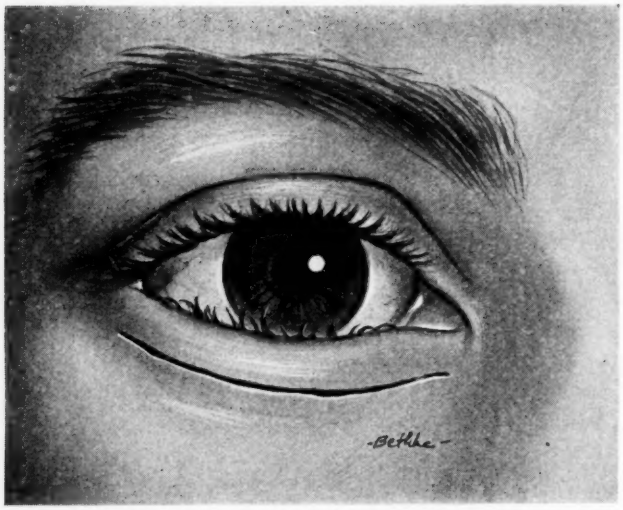

Fig. 5 (Wheeler). Correction of spastic entropion by shortening the orbicularis just below the tarsus of the lower eyelid. Skin incision.

the attachment of the muscle strip, so that the lid margin is in normal position. Such a result is in contrast to that obtained by skin excision, buried sutures, or cautery scars, which usually fail to have a permanent effect and which pull the lower-lid margin downward out of proper place.

Figure 4 shows comparative results in a patient on whom different methods were used for the two lower eyelids. On the right side, skin with orbicularis excision was performed once, and the cautery-puncture procedure was employed four times. Repeated operations were needed on account of recurrences of the spastic entropion. On the left side, the orbicularis-strip advancement was performed. Although the five procedures finally corrected the entropion of the right lower lid, they pulled the lid margin down out of place. On the other hand, the orbicularis advancement not only corrected the entropion in one maneuver but gave the lid margin good support, so that it is at the normal level.

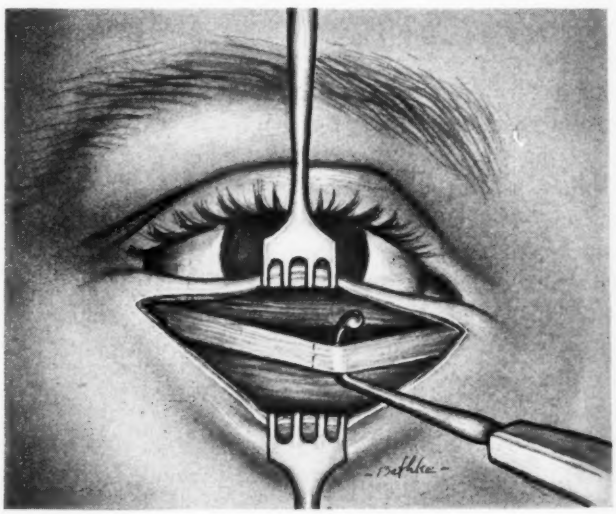

Fig. 6 (Wheeler). Correction of spastic entropion by shortening the orbicularis just below the tarsus of the lower eyelid. The skin is dissected up and the skin flaps are held in retractors. A strip of orbicularis muscle is dissected and held on a strabismus hook.

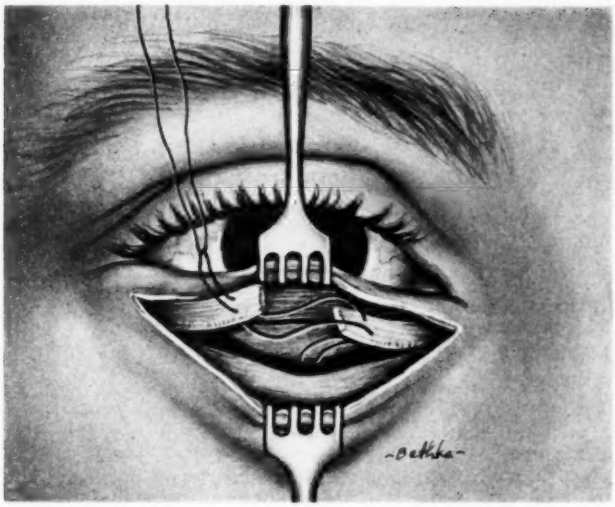

Fig. 7 (Wheeler). A double-armed suture has been carried through the tarso-orbital fascia below the tarsus and through each orbicularis flap 4 mm. from its end.

This operation was performed successfully in several cases and can be thoroughly recommended; nevertheless, about a year ago it occurred to me that a similar result might be obtained in a simpler way, and I offer as a useful alternative the following procedure that I then adopted:

An incision is made in the lower lid, about 5 mm. from the margin, extending nearly the whole length of the lid (fig. 5). Above and below the incision the skin is dissected from the orbicularis, and a strip of orbicularis muscle 4 mm. wide is dissected up, as shown in figure 6. This strip is taken from the muscle just below the lower border of the tarsus. It is cut in the center, but left attached at the ends. Then a 000 catgut suture is carried through the tarso-orbital fascia about 2 mm. below the tarsus. It is next carried through first one flap of the orbicularis strip and then through the other, so as to force an overlapping of 4 or 5 mm. (fig. 7). The suture is then tied, and the overlapping is made secure by

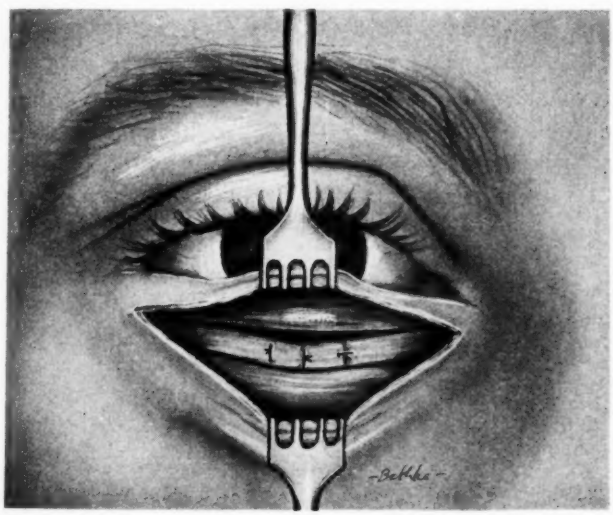

Fig. 8 (Wheeler). The overlapping of the orbicularis flaps is secured by 000-catgut sutures, and the shortened strip is held in position just below the lower border of the tarsus.

two additional catgut sutures, as shown in figure 8. The skin wound is closed and a secure dressing is applied.

With this method the results have been favorable, but in the first two cases in which I operated there was overcorrection as a result of the orbicularis strips causing too much pressure at the border of the tarsus. In these cases the overaction of the operation, with its resultant ectropion, was corrected by the use of cautery puncture on the conjunctival surface of the lids. After repeated trials I decided that an overlapping of 4 to 5 mm. seemed to be right.

This simple procedure can be recommended, but the operator must bear in mind the possibility of overcorrection or undercorrection.

References

[1] Ziegler. Jour. Amer. Med. Assoc., 1909, v. 53, p. 183.
[2] Pochisov. Sovietskii Viestnik Opht., 1935, v. 6, p. 131.
[3] Goldzieher. Klin. M. f. Augenh., 1908, v. 46, p. 426.
[4] Blaskovics. Zeit. f. Augenh., 1923, v. 49, p. 94.
[5] Vogt. Klin. M. f. Augenh., 1935, v. 94, p. 610.
[6] Vialeix. Ann d'Ocul., 1929, v. 166, p. 102.
[7] Hughes. Amer. Jour. Ophth., 1931, v. 14, p. 34.
[8] Weekers. Arch. d'Opht., 1932, v. 49, p. 427.
[9] Blaskovics and Kreiker. Eingriffe am Auge. Stuttgart, Ferd. Enke, 1938, p. 59.

Discussion

Dr. Edward Jackson, Denver: Dr. Wheeler has introduced us to a somewhat new field of lid surgery. I would like to ask if there is any difficulty in isolating the portion of orbicularis that is required.

Dr. John E. Weeks, Portland, Oregon: I have been very much interested in Dr. Wheeler's description of the operation that he has introduced and have no doubt that the results following this procedure are excellent. For many years I have employed a simple operation for the correction of spasmodic entropion, which is described and illustrated in my treatise, "Diseases of the eye."* Nearly all, if not quite all, cases of spastic entropion exhibit a redundancy of tissue in the lower lid on the side affected. By following the technique that I have described, the redundant tissue is removed, the appearance of the patient is improved, and the entropion is permanently corrected—at least I have seen no return of entropion in the cases I treated. I have employed multiple puncture by the cautery, the Gaillard suture, and other procedures, but have abandoned them all in favor of the simple operation referred to.

Dr. Ramon Castroviejo, New York: Dr. Jackson has asked whether it is difficult to isolate the fibers of the orbicularis in performing Dr. Wheeler's operation for the correction of spastic entropion of the lower eyelid. I should like to answer this question for Dr. Wheeler, since it will be more effective if the answer is given by some one who has not had the wide surgical experience and does not possess the skill of Dr. Wheeler. I have had the opportunity in one case of performing the operation that Dr. Wheeler has illustrated today. I did not find it difficult to isolate the fibers of the orbicularis, and the entropion was permanently corrected.

In another case of entropion of the

*Weeks. Diseases of the eye. Philadelphia, Lea and Febiger, 1910, p. 786.

upper lid I had planned to remove a strip of tarsus, but when novocaine was injected for local anesthesia, the entropion corrected itself. I thought then of Dr. Wheeler's operation for the spastic entropion of the lower lid, and a similar operation was performed on the upper lid of the patient. The entropion in this second case has been permanently corrected. It would be good judgment to keep Dr. Wheeler's operation in mind, since it could be performed in some cases of entropion of the upper lid.

DR. JOHN M. WHEELER, closing: I wish to thank Dr. Jackson, Dr. Weeks, and Dr. Castroviejo for their discussion of the paper. Dr. Castroviejo has partly answered Dr. Jackson's question. I do not know exactly what Dr. Jackson had in mind, but my technique has been something like this: to inject the lower lid thoroughly with novocaine, so as to secure good magnification of the fibers, and to reduce the entropion while the operation is going on. In the second procedure I spoke of, it is perfectly feasible to clamp the lid so that there will be no hemorrhage. In the dissection one is almost sure to divide the palpebral arteries, and they must be clamped in the dissection. I prefer to leave the orbicularis in place, and with the scissors cut down against the tarsus against which the strips are outlined, and then, lifting the outlined strips with a pair of forceps, cut under with very fine scissors; in this way it is easy, by holding the strip on a hook, to carry on the dissection toward the ends of the lids. The sutures are placed in such a way that one can be sure of the accurate overlapping and the position of the tightened orbicularis strips.

LECTURES ON MOTOR ANOMALIES*

IX. Oculomotor-nerve paralysis and ophthalmoplegias

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Palsy of individual muscles governed by the third nerve is rare in comparison with that of the sixth and fourth nerves. One can dispense with a detailed description, since the signs and symptoms and the principles of the diagnostic analysis are to be derived from what has been said about abducens- and trochlear-nerve palsies.

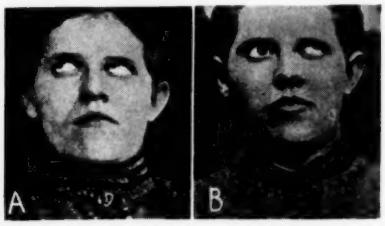


Fig. 34 (Bielschowsky). Isolated paralysis of the right inferior oblique muscle. Both eyes can be moved equally up and to the right (A), while in looking up and to the left (B) the right visual line cannot be raised above the horizontal plane.

Isolated paresis of the *inferior oblique* muscle is an extremely rare occurrence. The diagnosis of a total paralysis of the muscle as it is shown in figure 34A and B is easily made. In the primary deviation of gaze the paretic eye is deviated downward. In looking down there is no deviation at all and perfect binocular single vision. In supraversion the right eye lags behind. In looking up and to the right the elevation of both eyes is apparently equal, whereas in looking up and to the left the right visual line cannot be raised above the horizontal plane. From this it must be concluded that the right inferior oblique is totally paralyzed, because that muscle plays the main part in elevating the adverted visual line. Figure 35 shows the field of fixation taken by means of after-images. The lighter-dash line represents the limits of the left field of fixation; the heavier-dash line, the limits of the right field of fixation. Both lines almost coincide both in the lower and in the right periphery. The upper limits meet only in the right upper corner. In the left periphery the right visual line cannot be raised even to the horizontal plane. The same behavior is demonstrated by the diplopia test (fig. 36): binocular single vision in the right periphery as well as in the lower half of the field of fixation, except in the left corner of the lower periphery. In the right upper corner there is almost no vertical distance between the double images but a marked obliquity, whereas in the left upper corner they show the maximum degree of vertical divergence, but no obliquity, because the oblique muscles have no influence on the vertical movement of the abverted visual line; they have no influence on the position of the meridians—that is, on the torsion movement—while the eye is turned inward. If the patient's head is tilted toward the left shoulder, both the separation and the obliquity of the double images show the maximal degree, while by tilting it in the opposite direction binocular single vision is restored. The lateral separation of the double images is immaterial, because the loss of the abverting component of the oblique muscles cannot manifest itself if it is compensated by a nonparetic exophoria.

* From the Dartmouth Eye Institute, Dartmouth Medical School. Read before the Seventh Annual Mid-Winter Clinical Course of the Research Study Club, Los Angeles, California, January, 1938.

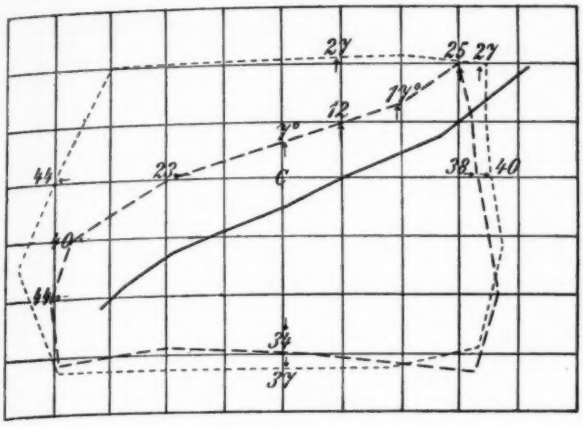


Fig. 35

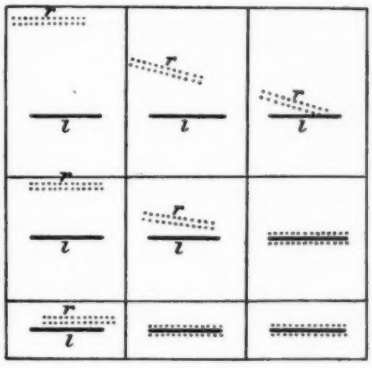


Fig. 36

Fig. 35 (Bielschowsky). Field of fixation taken by means of afterimages in a case of total paralysis of the right inferior oblique muscle. The light-dash line represents the limits of the left field of fixation, the heavy-dash line the limits of the right field of fixation; the unbroken line separates the area of binocular single vision (down and right) from the area in which diplopia exists (up and left).

Fig. 36 (Bielschowsky). Double images of a horizontal object in a paralysis of the right inferior oblique.

Isolated paresis of the *superior rectus* muscle is more often met with. In the majority of these cases it is of congenital origin, frequently combined with ptosis. The vertical divergence increases in elevation and in looking to the paretic side, since the superior rectus plays the main part as the elevator of the abverted visual line, which coincides with its muscle plane if the eye is turned out at an angle of 27 degrees. Figure 37 shows the double images in the field of fixation in a paresis of the left superior rectus muscle. Figure 38A to D demonstrates the deviation in the different positions of the eyes. As a rule, the slight horizontal separation points to the loss of the adverting component, but is immaterial as in all the pareses of vertical motors. The head tilting test does not give such unequivocal clues for the diagnosis as it does in paresis of the oblique muscles.

A habitual position of the head will be met with if it helps the patient to see

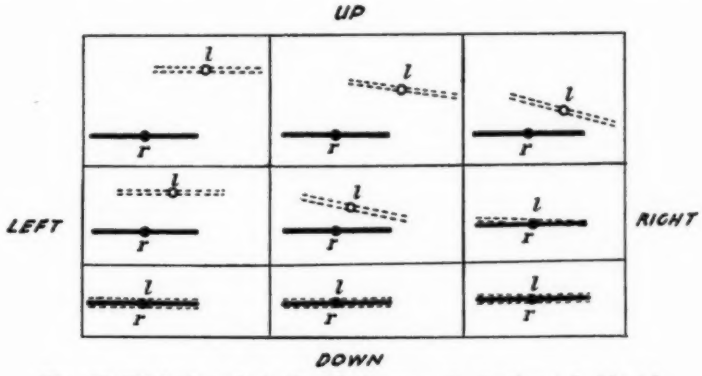


Fig. 37 (Bielschowsky). Double images of a horizontal object in paralysis of the left superior rectus muscle.

Fig. 38 (Bielschowsky). Paralysis of the right superior rectus. While the left eye is looking straight ahead, the right eye is deviated downward (A). In looking up, the right eye lags behind (B). In looking up and to the right the visual line cannot be raised above the horizontal plane (C). Both eyes are equally moved up and to the left (D).

single. The head is either tilted backward or turned to the paretic side, so that the paretic eye is either turned down or in while an object straight ahead is looked

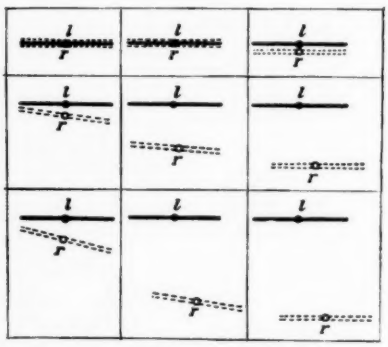


Fig. 39 (Bielschowsky). Double images of a horizontal object in paralysis of the right inferior rectus.

at. Which of these positions is chosen by the patient depends on the intensity of the paresis.

Isolated paresis of the *inferior rectus* is not infrequently due to traumatic lesions of the muscle. Figure 39 shows the double images in a typical paresis of the right inferior rectus. What was said before in the description of pareses of the other vertical motors applies, necessary changes being made, to that of the inferior rectus,

Paresis of the *internal rectus* demands special consideration. The internal rectus is the only muscle acting not only in parallel (lateroversion) but also in nonparallel (convergence) movements at the command of the will. Both functions, as well as only one, may be lost according to the site of the lesion. A loss of both functions without paresis of other muscles governed by the third nerve is very rare. Apart from peripheral injuries an isolated paresis of the internal rectus points to a lesion of its nucleus or the roots of its nerve, neither of which can be easily damaged without involving other ganglion cells or other roots of the third nerve. The clinical signs and symptoms of the paresis of the internal rectus show a behavior exactly contrary to that of abducens pareses: A habitual turning of the head toward the sound side; divergent deviation increasing when looking to the sound, decreasing when looking to the other, side; crossed diplopia, and so on. But there is one characteristic which is hardly ever found in any other paresis of a single ocular muscle. Most patients with a paresis or even a complete paralysis of the internal rectus are able to overcome the paretic divergence in the primary direction of gaze by means of a conver-

gence innervation, the only fusion innervation that is governed by the will. That is particularly striking in cases in which the maximum innervation for lateroversion fails to turn the paretic eye beyond the middle position toward the nose. But a convergence impulse is able to bring the paretic eye from an extremely divergent into the middle position, so that the parallelism of the visual lines will be restored and a distant object lying in the median plane of the head will be fixated binocularly. This movement of the paretic eye takes place without any coöperation from the paralyzed muscle. According to the law of the reciprocal innervation that was established by Sherrington, the antagonist of a paralyzed muscle—that is, the external rectus—must relax even if the paralyzed internal rectus does not respond to an innervation impulse. Since the divergent position in our case is brought about by the tonus of the external rectus, the eyeball will move after the relaxation of the latter toward its mechanical position of rest; that is, as a rule, to the middle position. Considering the innate association of accommodation and convergence, one would expect an increase of refraction to take place if the paretic divergence is overcome by a voluntary convergence impulse. Indeed, patients with a certain range of accommodation will notice that the outlying objects appear blurred if the divergence is transformed into parallelism by a voluntary impulse. But within a few seconds the vision becomes clear again, due to a relaxation of the accommodative surplus after the fusion tendency has assumed the maintenance of the increased convergence innervation which, as long as it was maintained by the will, was accompanied by a corresponding amount of accommodation.

Paresis of the *levator palpebrae* is rather frequently the earliest and sometimes the sole permanent sign of a lesion of the third nerve. It is easily distinguished from the sympathetic ptosis which, as a part of the Horner syndrome, is combined with a contracted pupil and a slight enophthalmos. Sympathetic ptosis is always incomplete and the pupil cannot be dilated by stimulating the sympathetic dilator iridis with cocaine. Spastic (pseudo-) ptosis, caused by a contraction of the palpebral portion of the orbicularis muscle, may be mistaken for paralytic ptosis, particularly if it is unilateral and not connected with epiphora and photophobia; it occurs as a professional neurosis—for instance, in watchmakers—or as a hysterical sign, or in malingerers. The spastic origin is recognized either by the resistance to the passive raising of the upper lid or by its flickering and trembling movements, moreover by the wrinkles of the skin of the lid, the lower position of the brow, and the raised position of the lower lid.

Voluntary closure of the lids is accompanied, as a rule, by an involuntary upward movement of the eyeballs. The diagnostic value of this so-called Bell's phenomenon will be discussed presently. Under normal conditions the vertical movements of the eyes are associated with the movements of the upper lids, both taking place in the same direction; in looking up the lids are raised, in looking down they are lowered. In exophthalmic goiter this synergy is disturbed rather frequently, inasmuch as the upper lids lag behind while the gaze is being lowered (Graefe's phenomenon). This is due to an increased tonus of the levator palpebrae muscles. We are at present more interested in the disturbances of the synergy under discussion occurring in the course of oculomotor pareses. A rather frequent and rather striking disturbance is called the pseudo-Graefe phenomenon, because it has a superficial

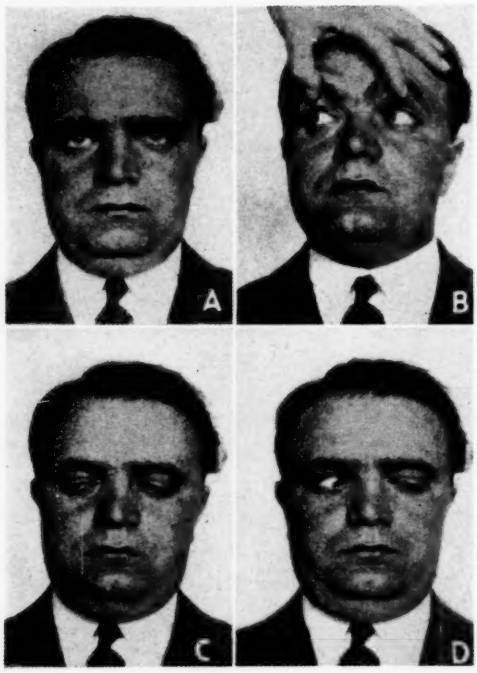


Fig. 40 (Bielschowsky). Pseudo-Graefe phenomenon as a residue of right oculomotor paralysis. A shows a slight anisocoria in the primary position as the only sign of the previous paralysis. B shows considerable dilatation of the pupil of the right eye in dextroversion. C, the upper lids are in equal position in looking down and to the right. D, striking retraction of the upper lid of the right eye (pseudo-Graefe phenomenon) and narrowing of the pupil of the right eye in looking down and to the left.

similarity to the true Graefe's phenomenon. The photographs of some such patients show different types of the phenomenon.

1. A man, 30 years of age, acquired paralysis of the right third nerve through a fracture of the base of the skull. Three months after the accident, I found as the only residues of the paralysis that the right pupil was moderately dilated, the light reaction was reduced to a minimum (fig. 40A to D), the convergence reaction was nearly normal, and there was a slight paresis of the superior rectus muscle. In the primary position the eyes were parallel; the upper lids were equally high (fig. 40A). In looking down and to the right both the upper lids accompanied the eyes normally (C), whereas in looking down and to the left the right upper lid was retracted and the right pupil narrowed, so that the anisocoria disappeared (D).

2. A woman, 28 years of age, had total right oculomotor paralysis, the origin of which was not determined. Five months later she presented the signs demonstrated by the photographs (fig. 41A to D). The case differs from the previous one in that the upper lid did not go down at all either in looking down or in looking down and to the right. Probably this difference was due to the fact that the depressor muscles had recovered less in this case than in the others. But a true retraction of the right

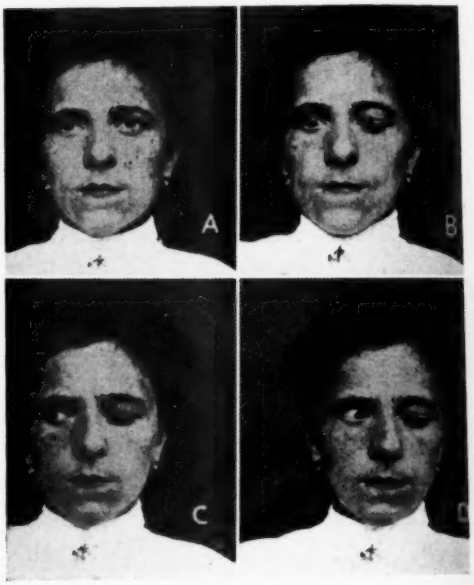


Fig. 41 (Bielschowsky). In the primary position (A) dilatation of the pupil of the right eye is the only sign of the previous right oculomotor paralysis. In B and C the right upper lid remains unmoved when the impulse to look down or down and to the right is given. There is striking retraction of the right upper lid while the patient is looking down and to the left (D).

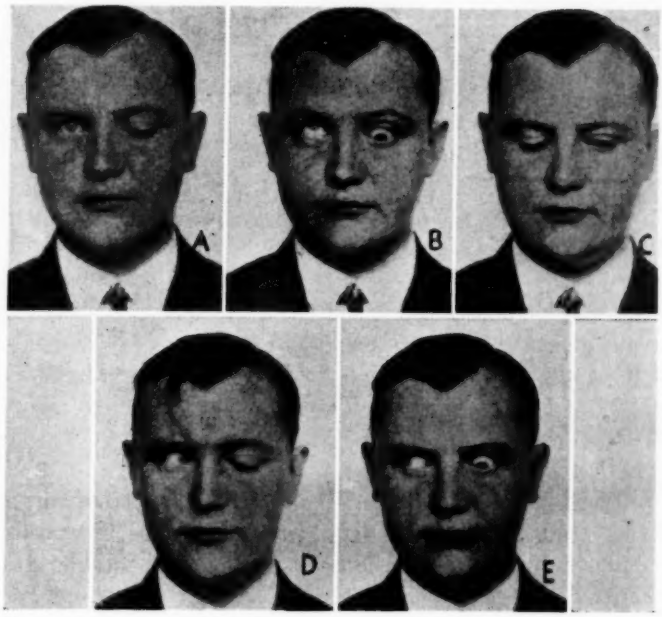
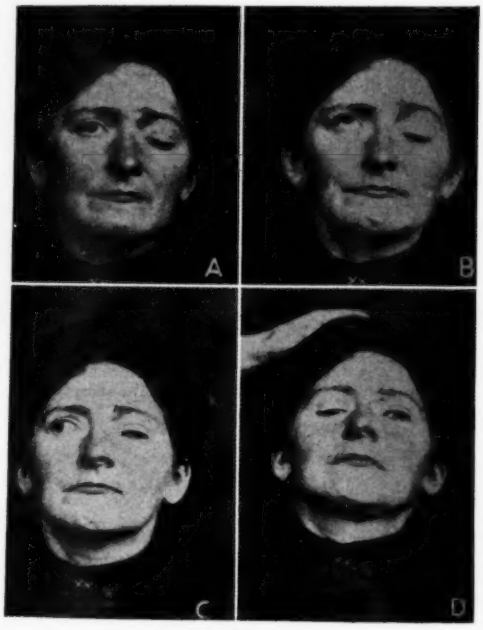


Fig. 42 (Bielschowsky). A shows left oculomotor paralysis, with the left upper lid completely relaxed. In B, a maximum contraction of the left superior oblique prevents the left eye from reacting to the elevation impulse, the left upper lid being raised considerably. In C, maximum innervation of the depressor muscles causes a slight lifting of the upper lid. D shows the levoversion impulse, with complete relaxation of the left upper lid. E shows, as an effect of the dextroversion impulse, maximum retraction of the left upper lid.

upper lid took place only in looking down and to the left. The right pupil behaved exactly as in the other case.

3. A student had total paralysis of the left third nerve as a result of a fracture of the base of the skull. The most interesting sign of the paralysis in its first stage was the enormous contraction of both left depressor muscles, chiefly of the superior oblique, which was especially impressive when the patient was looking up (fig. 42A to E). The left eye appeared stationary, while the right eye was looking straight ahead, to the right, down, or up. Only in looking to the left was there a moderate abversion of the left eye with the same degree of depression.



The patient was under my observation for more than three years. Not until 15 months after the fracture was the first change noticed. In the left upper lid which, hitherto, had been completely relaxed, some folds appeared, and while looking straight forward the patient was unable to lift the lid more than 3 mm. by a maximum effort. On looking to the left

Fig. 43 (Bielschowsky). A shows total left ophthalmoplegia. The elevation impulse does not influence the left upper lid (B). C shows a slight lifting of the upper lid of the left eye in dextroversion. In D, the left upper lid goes up while the patient is looking down (head thrown back).

the lid became completely relaxed and could not be raised at all, whereas when a strong impulse for looking down was given it rose a few millimeters automatically; this retraction was greater when the right eye looked up; a maximum retraction of the left upper lid was found in connection with the impulse to look to the right.

4. A woman, 35 years old, had basal syphilis, which had caused atrophy of the left optic nerve, paralysis of the left fifth nerve, and total left ophthalmoplegia. The left eye was immovable (fig. 43A to D). The left upper lid could not be raised by the strongest effort; it remained relaxed even when the patient looked up (B), but when she looked to the right it rose automatically a little (C), and in looking down it rose still more (D), concurrently with the arrival of the normal right upper lid at its lowest position.

E. Fuchs explained the so-called pseudo-Graefe's phenomenon as follows: Because the third nucleus is injured, or has become atrophic in consequence of a retrograde degeneration, the nervous stimulation sent to a part of the third nucleus extends over the neighboring parts, so that unintended, together with intended, movements are obtained. In my opinion, this theory cannot be reconciled with the following facts: First, there are patients who display the retraction movement of the upper lid in spite of the fact that all the exterior ocular muscles have lost their function completely and the levator palpebrae reacts only automatically to impulses sent to certain other muscles, especially the depressors, which have no physiologic (functional) connections with the levator palpebrae. Further, in nearly all of my patients who showed the phenomenon under discussion the paralysis of the third nerve must have been located at the basis cranii. Either there had been a basal fracture or the symptoms additional to the third-nerve paralysis necessitated that localization. I cannot imagine a complete retrograde nuclear degeneration, as Fuchs supposed, in which only the nucleus innervating the levator muscle is spared and even this nucleus is not capable of being stimulated voluntarily but responds only to impulses sent to some other atrophic parts of the third nucleus.

I think that the pseudo-Graefe sign can be explained in a less far-fetched manner. Suppose that the continuity of the third nerve is interrupted by a trauma or a tumor. In the course of healing some of the fibers which proceed from the central part of the trunk of the third nerve do not find their original sheaths in the peripheral part of the nerve but go astray, so that they arrive at muscles to which they do not belong. For instance, the fibers from the nucleus intended for the internal rectus arrive not at this muscle but at the levator of the upper lid, so that the impulse for adversion produces lifting of the upper lid, even if it cannot be lifted by a direct innervation effort because the fibers coming from the levator nucleus have gone astray. In some cases a part of the nerve fibers intended for the levator arrive at this muscle together with fibers of a different origin, so that there is no ptosis but an abnormal retraction of the upper lid as soon as an impulse is sent to certain other eye muscles. It seems that the nerve fibers in the course of healing prefer certain "routes" for growing in the wrong sheaths, so that in the majority of cases the impulse to look down and in produces the strongest contraction of the levator of the upper lid.

Another interesting lid phenomenon is the so-called sign of Marcus Gunn, or jaw-winking (fig. 44A to D). In most of these cases there is unilateral congenital ptosis, sometimes combined with paresis of other muscles supplied by the third

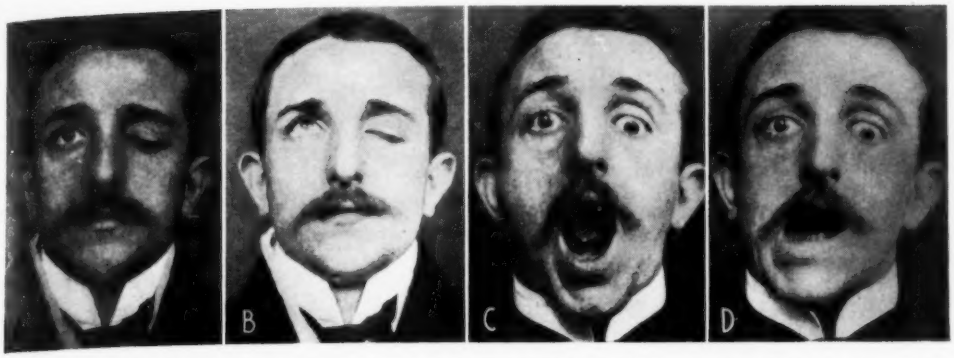


Fig. 44 (Bielschowsky). Jaw-winking phenomenon. Congenital ptosis and paralysis of the elevator muscles of the left eye (A). The left upper lid can be raised neither voluntarily nor in looking up (B), but is retracted involuntarily when the mouth is opened (C) or the jaw is moved to the right (D).

nerve, mostly the superior rectus, and in only a few cases is ptosis absent. The photographs show an example of the jaw-winking phenomenon. There is a moderate congenital ptosis of the left upper lid, which can no more be raised by a voluntary innervation of the levator palpebrae than it can in looking up. But if the mouth is opened or the jaw is moved to the right there is a striking involuntary retraction of the left upper lid. It drops down while the jaw is moved to the left. In some cases these unilateral movements of the upper lid are connected with the act of sucking or swallowing. The jaw-winking phenomenon is generally explained by assuming that in such cases the nerves supplying one of the levators originate in that part of the fifth nerve which also supplies the jaw muscles, particularly the external pterygoid muscle.

Without discussing the well-known signs and symptoms of the total paralysis of the third nerve, I would mention only a few unusual and interesting phenomena that occur in some of these cases. Rather frequently there is a marked exophthalmos due to the loss of the retracting component of nearly all the eye muscles. Occasionally one will find a striking retraction movement of the protruding eye when turned out. That the exophthalmos is responsible for the retraction movement in those cases must be inferred from the fact that both disappear at the same time, while the paralyzed nerve regains its function.

A rare phenomenon, called "nystagmus retractorius" by Körber,[1] who first described it, may be mentioned because of its topical diagnostic value. It has been observed only in cases of grave injury of the nuclear region between the third and the fourth ventricle, either diagnosed by the characteristic paretic signs and symptoms of indubitably nuclear origin or substantiated by autopsy. Elschnig's[2] case was caused by a cysticercus vesicle in the third ventricle; other cases have been due to tumors of this region. Besides paresis of a few or many muscles of both eyes, the most striking sign is a retraction of one or both eyes following every impulse sent to the ocular muscles. Elschnig has explained this phenomenon as follows: The compression of the whole nuclear region and all its connections, especially the posterior longitudinal bundle, causes disturbance of such kind that every motor innervation not only excites the ganglion cells that are responsible for the intended movement but spreads over the whole nuclear region, thus bringing about the

simultaneous contraction of all the external ocular muscles and the consequent retraction movement.

If the paralyzed eye is constantly fixating because of ametropia or amblyopia of the other eye, the secondary deviation can assume really grotesque forms. Figure 45A to C shows total bilateral oculomotor paralysis with the right eye fixating. The left eye is hidden behind the external angle of the palpebral fissure as a consequence of the enormous contraction of the left external rectus. The cornea of the left eye is revealed only by a strong dextroversion impulse.

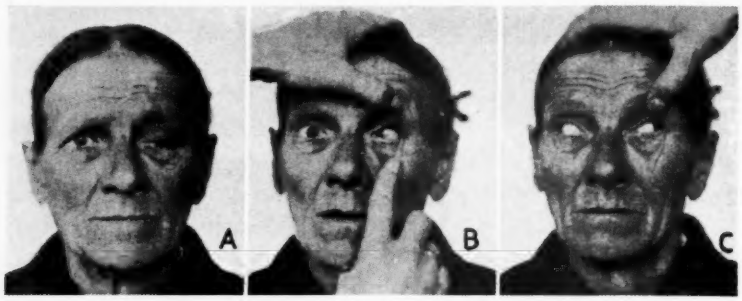


Fig. 45 (Bielschowsky). Total bilateral oculomotor paralysis. Right eye is fixating (A) while the cornea of the left eye is hidden behind the external angle of the palpebral fissure as a consequence of the enormous contraction of the left external rectus (B). The cornea of the left eye is revealed by a strong dextroversion impulse (C).

In total oculomotor paralysis the pupil is dilated and the reaction to light as well as to the convergence impulse is missing. During recovery the convergence reaction is quite frequently restored earlier than the reaction to light. There are many cases in which, after the exterior muscles have regained their function, the pupil remains more or less dilated while the convergence impulse, though somewhat sluggish as a rule, shows a fairly normal range in contrast to the complete absence of the light reaction which, in quite a number of cases, never returns. In most of them there is also to be found a very striking orbicularis phenomenon of the pupil; that is, a contraction of the latter taking place when the lids are closed forcibly. This peculiar behavior of the pupil, which has been observed even in cases in which the paralysis of the third nerve was due to a lesion of the trunk, has not yet been explained satisfactorily. It would be easily understood by the assumption that the nerve supplying the sphincter iridis has two roots either of which could be damaged separately. The fibers bringing about the convergence reaction might be more resistant than those responsible for the light reaction, so that they also recover more quickly and more completely. But there is as yet no anatomic proof of such a hypothesis. In some of the cases with the aforementioned pseudo-Graefe phenomenon the involuntary reaction of the upper lid is accompanied by an isolated contraction of the pupil which otherwise showed either normal or a sluggish or no reaction to light at all. This pupillary phenomenon must be explained in the same way as that of the upper lid, by assuming that some of the oculomotor fibers, after the trunk had been interrupted by some lesion or other, do not find their original sheaths in the peripheral part of the nerve but go astray, so that some of the fibers intended either for the internal or the inferior rectus,

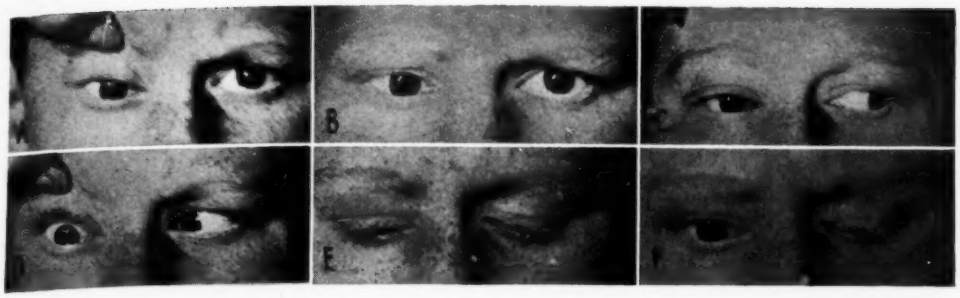


Fig. 46 (Bielschowsky). Cyclic right oculomotor palsy combined with abducens palsy. A shows the paralytic phase: complete ptosis, the pupil of the right eye dilated maximally. During the spastic phase the right palpebral fissure is opened and the pupil of the right eye narrowed maximally (B). The levoversion impulse elicits the spastic phase (C); dextroversion, the paralytic phase (D). Equal position of the upper lids in looking down during the paralytic phase (E); pseudo-Graefe phenomenon during the spastic phase (F).

but arriving at the sphincter iridis, may cause a contraction of the pupil when the patient gives an impulse for in- or downward movement. Very interesting are some observations of total oculomotor paralysis in which all the pupillary reflexes are apparently completely abolished but a prompt contraction of the pupil takes place if an abversion impulse is given, a behavior which points to a congenital anastomosis between the abducens nerve and the ciliary ganglion.

The most peculiar features are presented by the cases of so-called *cyclic oculomotor palsy* (Axenfeld), the principal characteristic of which is the automatic alternation of spastic and paralytic conditions of the paretic eye (fig. 46A to F).

According to his mother the patient was born with normal eyes. When he was one year old the right upper lid gradually drooped. In 1920 he was brought to Uhthoff's clinic, where right oculomotor paralysis and right abducens-nerve paresis were noted and a ptosis operation was performed. I saw the boy eight years later and noted the automatic alternating spastic and paralytic conditions. In the latter phase there was a nearly complete ptosis in spite of the previous operation (A). The right pupil was dilated maximally and was rigid. When the patient was left to himself staring into vacancy, one could observe after a fraction of a minute a little twitch arising in the paralyzed upper lid, gradually becoming quicker and livelier and finishing with a complete opening of the palpebral fissure. At this moment the right pupil, which before had been dilated, would contract to the minimum size while the left pupil kept its normal size unchanged (B). After 10 or 20 seconds the right upper lid would go down slowly, and at the same time the right pupil would dilate again. This cycle repeated itself at irregular, but mostly very short, intervals all day and all night, provided the patient did not make voluntary eye movements of great extent. The influence of voluntary movements is shown by the subsequent photographs. When the boy was ordered to look to the left during a spastic phase (C), this phase would remain as long as the patient maintained the levoversion. If the order was given during a paralytic phase, this phase would be interrupted after a few seconds and replaced by the spastic phase. The contrary effect was obtained by the antagonistic voluntary innervation. As soon as an impulse for dextroversion was given, the pupil of the right eye would dilate and

the upper lid would droop (D), the condition persisting as long as the boy looked to the right. The last photographs show the position of the right upper lid in looking down during a paralytic (E) and during a spastic (F) phase. The latter gives an impression of the pseudo-Graefe phenomenon.

When I collected the case reports of so-called cyclic oculomotor paralysis, I found altogether 32; having seen 10 cases myself, I am convinced that the condition is not so rare as the small number of published cases would lead one to suppose. There are rudimentary forms of the phenomenon which in the example cited was rather fully developed. Only the pupil of the paralyzed eye has shown the cyclic type of paralysis in all the cases observed by me and reported by others. In one third of the cases the upper lid did not participate in the cyclic phenomenon. Cases in which the internal rectus muscle shared in the cycle are fewer still, and it is exceptional to find the inferior rectus actively involved. The elevator muscles never participate in the alternating spasms and relaxations. So it is easily understood that mild cases, presenting perhaps only the phenomenon of automatically alternating dilation and contraction of the rigid or apparently paralyzed pupil, are overlooked. Some of them have been reported as cases of third-nerve paralysis showing a peculiar pupillary phenomenon. In about 50 percent of the cases the phenomenon is not congenital but acquired in early childhood; in one case it did not appear until the seventeenth year of life. In the majority of cases the paralyzed eye is highly amblyopic or ametropic. As to the localization and the origin of the phenomenon only theories have been advanced. In a former publication[3] I have discussed the problem at length and have explained why, in my opinion, the lesion must be localized in the region of the third nucleus. Varying vasomotor influences probably play a part in bringing about automatic alternation of spastic and paralytic phases. The interesting influence of voluntary movement impulses in the course of the phenomenon I have tried to explain as follows: A part of the oculomotor nucleus, which has retained but a slight degree of function, seems to react only if it is abundantly supplied with blood. This is obtained when, by sending an impulse to the oculomotor nucleus, the blood vessels in this region are made to dilate; after a short interval the spastic phase arises. On the other hand, an antagonistic impulse going to the abducens nerve of the paralyzed eye seems to cause an inhibition of the oculomotor excitation by the contraction of its blood vessels; the paralytic phase results. The reasons for my theory are given in detail in the publication just mentioned.

Another interesting group of oculomotor palsies comprises cases of *recurrent third-nerve palsies*, frequently called *ophthalmophlegic migraine*, after Charcot. Their main characteristics are as follows: The first attack starts either in childhood or adolescence with severe headaches confined, as a rule, to one side of the head, frequently followed by vomiting. The headaches last a few days, then cease and are followed by a longer or shorter period of perfect well-being. After one or several years an attack of the same kind is followed by a total paralysis of the third nerve which rapidly develops on the side where the headaches are located, one or several days after the onset of the latter. These abate once the paralysis is complete, which outlasts the headaches for some days or weeks but at last subsides completely. After some recurrence of these attacks the third nerve does not regain its normal function but at first paresis, and finally a total oculomotor paralysis remains while the attacks of headaches may stay

away. The sixth and the fourth nerve participate only exceptionally in the aforementioned attacks. As to their origin, the authors are still at variance. While the symptoms in some cases point to a basal lesion, particularly to neoplasms or inflammatory affections in the region of the superior orbital fissure, the carvernous sinus, and the chiasm, numerous observations lead to the assumption that the attacks of ophthalmoplegic migraine are due to spastic disturbances of the blood vessels, which in the course of time may cause an atrophy of the third nucleus.

Besides the recurrent third-nerve paralyses with the symptoms of migraine, there is a much smaller group of recurrent and alternating palsies of the oculomotor apparatus to be met with in tabes, cerebral syphilis, myasthenia, and multiple sclerosis. At one time one muscle group of one eye is affected, at other times this eye may be normal but the same or other muscles of the second eye paretic, or both eyes may be either partially or totally paralyzed. The disease, the nature of which in the absence of other neurological signs cannot always be cleared up, may drag on for many years.

Among the partial oculomotor pareses the cases in which the paresis is confined either to the exterior or to the interior branches of the third nerve are important with regard to their topic diagnostic value. Although lesions of the trunk of the nerve do not always effect a paresis of all the muscles supplied by the third nerve, in general one is warranted in locating a protracted paresis of either the exterior or interior branches of the nerve in the region of the nuclei and the roots, respectively.

Ophthalmoplegias

Paresis of several of the motor nerves of the eyes is called ophthalmoplegia. Acute ophthalmoplegias may be due either to poisoning (by alcohol, lead, botulism) or to acute infectious diseases (diphtheria, epidemic encephalitis, measles, typhoid fever, and allied diseases). In acute hemorrhagic poliencephalitis due to alcoholism there is a bilateral ophthalmoplegia confined to all the exterior muscles, while the intraocular muscles remain intact. It develops rapidly and the patients die within one or two days. In botulism the intraocular muscles of both eyes are paralyzed, while some of the external muscles are affected in only about 50 percent of the cases. A characteristic of the postdiphtheretic bilateral paralysis of accommodation is the exemption of the pupils. Pareses of extraocular muscles occur in only 1 percent of diphtheria. All kinds of ocular paralyses are met with in epidemic encephalitis: pareses of single muscles as well as unilateral and bilateral ophthalmoplegias, moreover bilateral paresis of accommodation, anomalies of both the size and the reaction of the pupils, even paralyses of the associated movements pointing to supranuclear lesions. Chronic progressive ophthalmoplegias occur not only in the aforementioned diseases of the cerebro-spinal nervous system (tabes, multiple sclerosis, and so on), but as an isolated disease. In many cases a hereditary disposition has been ascertained. During childhood or adolescence the single extraocular muscles of the two eyes become paralyzed very gradually in irregular succession. Sometimes in a later stage the intraocular muscles are also involved (fig. 47A to C). The photographs show one of these cases. The boy's eyes were normal until he was six years old. Then a bilateral ptosis developed gradually. He has never noticed diplopia. I saw him when he was 14 and was able to observe the further development until he was 22 years old. The intraocular muscles of both eyes have always remained intact. His head is habitually

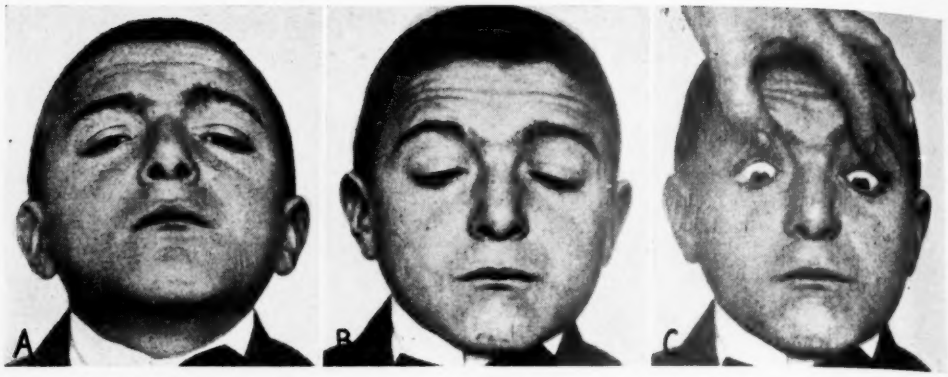


Fig. 47 (Bielschowsky). Chronic progressive ophthalmoplegia. Habitual position of the head (A) compensating for the total paralysis of the elevator muscles and maximal secondary contraction of the depressors (B). C shows bilateral ptosis while the head is erect; maximal convergence occurs when the patient receives an impulse for elevation.

tilted backwards, partly because of a total paralysis of the elevators and an enormous secondary contraction of the depressor muscles. When he is asked to look upward there is not the slightest vertical but a maximal convergent movement of the eyes. In striking contrast to the perfectly normal convergence is the complete bilateral deficiency of the adduction movement in parallel lateroversions, a behavior pointing to a supranuclear origin of that deficiency, since the nuclei and nerves supplying the internal recti muscles react normally to the convergence impulse.

This observation leads to a discussion of *internuclear and supranuclear ophthalmoplegias.* As was said before, the internal rectus is the only ocular muscle possessing two functions at the command of the will, one obeying the impulse to a parallel movement of the eyes, the other governed by the convergence impulse. Both functions, as well as only one, may be destroyed, according to where the lesion has taken place. Loss of the convergence function alone is frequent, owing to either functional or organic disturbances. It will be discussed later on. Loss of adduction in parallel lateroversion while convergence is intact is seldom observed. In the majority of these cases there is an associated paralysis of the lateral movement; that is, the external rectus of one eye and the internal rectus of the other eye are paralyzed. Such cases are to be discussed later. The loss of adduction only in conjugate parallel movements while adduction is normal or less impaired in convergence is very interesting and important on account of its value in topical diagnosis. Such a condition can be caused only by a lesion of the posterior longitudinal bundle between the sixth and the third nucleus (ophthalmoplegia internuclearis anterior). This lesion, taking place close to the third nucleus, may cause loss of the adversion faculty of either eye in parallel movements, whereas convergence remains intact. The photographs (fig. 48A to C) show a patient with internuclear paralysis of both internal recti, due to a lesion of the posterior longitudinal bundle. The patient had noticed diplopia three weeks before she came to the clinic. Since the function of the internal recti was fully restored after five weeks, the assumption that there had been a slight hemorrhage within the posterior longitudinal bundles seems warranted.

Besides the internal recti there is only

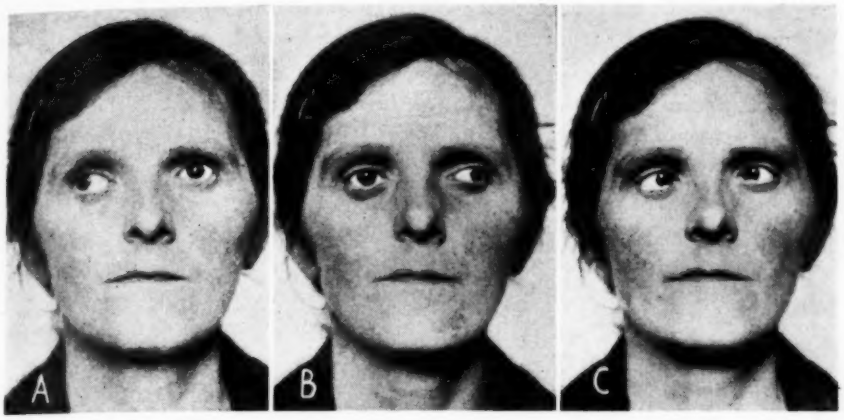


Fig. 48 (Bielschowsky). Ophthalmoplegia internuclearis anterior. Bilateral loss of adduction in lateroversion (A and B); normal adduction in convergence (C).

one pair of muscles, the unilateral paralysis of which can be attributed positively to a supranuclear lesion. Figure 49A to C shows photographs of a patient with apparently total paralysis of the right elevator muscles (A). The right eye was turned far down, while the left looked straight ahead (B). The maximum impulse to look up raised the right visual line only to the horizontal position (B). Vestibular stimulation of the elevator muscles was just as ineffective. But if the patient was asked to close the eyes and the right lids were pulled open, the right eye could be seen to move up perfectly (C). The integrity of the right elevator muscles in Bell's phenomenon proves that the nuclei of the nerves supplying the right elevator muscles are intact; only their connections with the cortical centers are destroyed. The lesion must be localized close to the nuclei, below the point where the pathway descending from the cortical centers for the elevation of the eyes bifurcates into the branches which go to both the third nuclei. In a later stage of the disease the paralyzed right elevator muscles responded also to vestibular innervation. But the reaction to the voluntary impulse was never restored.

Another patient had an intracranial

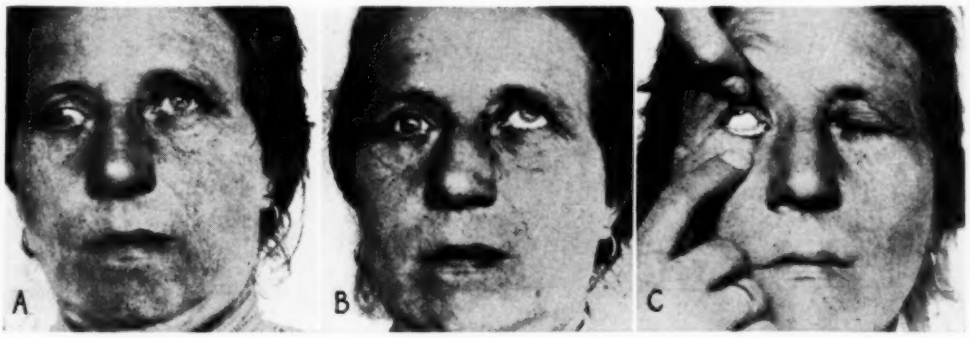


Fig. 49 (Bielschowsky). Supranuclear paralysis of the right elevator muscles: right eye deviates downward while the left eye is in the primary position (A). The maximum impulse to look up brings the right visual line only to the horizontal position (B). Normal reaction of the apparently paralyzed right elevator muscles when the patient is asked to close her eyes (C).

tumor with a metastasis in the neck. X rays showed complete destruction of the greater wings of both the sphenoids and of the sella, pointing to a basal lesion. The diagnosis was supported by an almost complete bilateral ophthalmoplegia and bilateral optic atrophy. The only ocular movement that could be performed was depression. The right eye did not respond at all to the elevation impulse, while maximum effort brought the left visual line just a few degrees above the horizontal plane. In view of the apparently unequivocal basal localization of the lesion, the maximum elevation of the left eye that took place in Bell's phenomenon was all the more surprising. It proved that while the right elevators in the last-mentioned test were functioning no more than in all the other tests, the nuclei as well as the nerves supplying the left elevators were intact but cut off from all their supranuclear connections, except the pathway used in Bell's phenomenon, by a part of the tumor extending up to the corpora quadrigemina.

These observations, the only ones which have been published, are important for topical diagnosis. One should never forget to examine whether and how apparently totally paralyzed elevator muscles react in Bell's phenomenon.

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AN INNOCUOUS CLINICAL ENTITY SIMULATING TABES DORSALIS

PUPILLOTONIA WITH ABSENT TENDON REFLEXES (ADIE'S SYNDROME)

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In August, 1937, H. F., aged 25 years, possessing a sound mind in a sound body, consulted me because he had repeatedly been refused life insurance on the ground that he exhibited metaluetic manifestations. He had large pupils that were immobile to light but reacted to accommodation-convergence; in addition, his ankle and knee jerks were absent. His sister, aged 24 years, in sound health and well poised, presented a similar clinical picture.

In 1902, Strasburger[1] described a hitherto-unknown pupillary anomaly characterized by (1) unilaterality, (2) mydriasis, (3) fixity to light, directly and consensually, and (4) a unique contraction upon convergence. Later in the same year, Saenger[2] reported several cases that conformed with Strasburger's observations. Saenger believed that the site of the disturbance was in the iridic musculature *per se*, and that the disorder was of the same nature as obtains in myotonia congenita (Thomsen's disease), hence his designation, "myotonic pupillary reaction." The outstanding feature in all these cases was the unusual behavior of the pupil to the stimulus of convergence. Since myotonia congenita and this pupillary abnormality are now regarded as unrelated entities, the term *pupillotonia* is preferred by most writers on the subject; for the striking characteristic of the picture is the sustained contraction or the continued tonicity of the pupil after the stimulus is removed. In 1899, Piltz[3] had already noticed that in certain instances, the Westphal-Piltz reflex revealed a pupillary response that is quite similar to that of pupillotonia.

Pupillotonia presents the following features: The phenomena are almost always limited to one side. The affected pupil is wider than its fellow. It is unmistakably dilated, is frequently eccentric and moderately irregular. It is said to be uninfluenced by fatigue, excitement, or the state of health.[4] When tested in the routine fashion, the pupil does not react to light directly or consensually. When focusing upon a near object, there is no immediate contraction of the pupil; this may give the impression that the pupil is inactive to the accommodation-convergence stimulus. However, as the patient persists in the near gaze, the pupil, after a short interval, starts to contract leisurely but at a progressively diminishing rate until miosis obtains, which may reach an extreme degree. When the patient now looks into the distance, the pupil does not relax immediately; in fact, it may continue to contract still more before commencing to dilate to attain its original diameter, the dilatation being more tardy than the contraction and covering a longer period of time. The delay in both phases of the pupillary response may be considerable. Holmes[5] reports a case in which 5 minutes elapsed before the pupil contracted upon convergence, and even more time was consumed in its relaxation. Although the photomotor reflex appears to be abolished, that is actually not so, for it can be evoked by a special procedure. If the patient is kept in a dark room about an hour, it will be noticed that the involved pupil is now a little larger than it was previously, and that the fellow pupil approximates it in size. If the eyes are

then suddenly exposed to bright diffuse light, for example, a room flooded with sunlight, the affected pupil, after a short delay, will sluggishly contract to its original size, or may become somewhat smaller; in the latter event, there may be a perceptible interval before the pupil resumes its usual diameter. Not infrequently, corresponding to the persistent contraction of the pupil upon convergence, there is an accompanying spasm of the ciliary muscle, causing an annoying dysfunction of accommodation: the patient sees a near object distinctly, but, upon looking in the distance, his vision is blurred for several seconds or more until the ciliary muscle relaxes. Although the amount of accommodation is increased—that is, the patient can accommodate to a point nearer to his eyes—the range, nevertheless, is greatly diminished or may be practically nil. In one instance, the patient saw the appropriate near type distinctly only at a distance of 15 cm., no nearer and no farther. This disturbance continued about 6 seconds, and it took 50 seconds more before the accommodation resumed its usual flexibility. Reitsch[6] quotes a case of pupillotonia in which the ciliary spasm lasted an hour, causing a severe headache which was relieved by homatropine. The following data, taken from an article by Behr,[7] depict a typical example of pupillotonia.

Right pupil (abnormal)	Left pupil (normal)
Diameter of pupil, patient facing window, 5.5 mm.	2.5 mm.
Diameter of pupil, patient's back to window, 6 mm.	3 mm.
Diameter of pupil, three-fourths hr. sojourn dark room, 7 mm.	6 mm.
Diameter of pupil to convergence, 2.5 mm. (a contraction of 3.5 mm.)	2 mm. (0.5 mm.)
When patient converged to 30 cm., 6 seconds elapsed before pupil responded, remained contracted for 10 seconds after removal of stimulus, and then sluggishly dilated, attaining its normal width in 50 seconds.	Pupil reacted promptly upon convergence and dilated just as promptly upon removal of stimulus.
Upon focusing at a distance of 30 cm., after an interval of 6 seconds, spasm of accommodation occurred, bringing both the far and near points to a fixed distance of 15 cm., thus extinguishing completely the range of accommodation. This lasted 10 seconds, when the spasm gradually relaxed, and normalcy was reached in 50 seconds.	Accommodation act and range, normal.
Westphal-Piltz reflex, exaggerated.	Normal.

Pupillotonia may digress from the norm. The following deviations have been noted: (1) The pupil does not maintain a uniform dilatation; it may vary in size even in the course of the examination, although only to a moderate degree. (2) The light reflex cannot be elicited in spite of the most painstaking effort. (3) The reaction to convergence offers nothing unusual except for a slow dilatation upon removal of the stimulus; or the reaction may be typical on one occasion and perfectly normal at other times. (4) The pupil is absolutely immobile to light and to convergence. (5) The previously tonic pupil may become subsequently totally fixed, having ceased to react to light and to convergence; and, conversely, a fixed pupil may exhibit later on characteristic tonic phenomena. (6) Bilaterality, though very rare, yet strangely present in the two cases reported herein. (7) Both pupils show one or more of the variations enumerated above, or one pupil is typically tonic and the other manifests these variations.

Cases of iridoplegia and ophthalmoplegia interna totalis (so-called fixed pupils), whose origin is unknown, are regarded by Adie[8] as aberrant forms of pupillotonia.

In pupillotonia, the pupil contracts promptly and vigorously to pilocarpine, eserine, and cholin preparations. Cocaine

and atropine produce the usual dilatation; and if adrenalin is now added, further dilatation (maximal mydriasis) takes place.

An important associated sign is loss of the deep reflexes. As a rule, the reflexes are absent on both sides; exceptions, however, are not uncommon. Some of these reflexes may be missing on one side, and different ones missing on the opposite side. The reflexes most frequently affected are the ankle jerks, then the knee jerks and arm jerks.

Adie[9] divides pupillotonia into (1) complete forms and (2) incomplete forms. The latter are subdivided into (a) tonic pupils alone, (b) atypical phases of tonic pupil alone, (c) atypical phases of tonic pupil with absence of the deep reflexes, and (d) absence of deep reflexes alone.

Pupillotonia, when accompanied by the loss of deep reflexes, suggests to the attending physician tabes dorsalis, and such cases have been subjected to prolonged antiluetic treatment, to the mental and financial distress of the unfortunate patient. The tonic pupil is naturally mistaken for the Argyll Robertson pupil. A careful analysis will readily establish the differential diagnosis. In the first place, the Argyll Robertson pupil is only exceptionally unilateral, in which case the affected pupil is the smaller one; while in pupillotonia, the affected pupil is always larger than its fellow. As a rule, in pupillotonia the pupil is less irregular than is the Argyll Robertson pupil. The Argyll Robertson pupil is refractory to the light stimulus under all circumstances, and it will not dilate upon a long sojourn in the dark. It responds promptly to accommodation-convergence, and dilates as promptly when the stimulus is removed. Atropine does not produce a maximal dilatation, and cocaine is altogether ineffectual; in pupillotonia these drugs exhibit their full action. When the photomotor reaction is absent in pupillotonia, subcutaneous injection of strychnia will provoke a definite though feeble response, or will augment it, if it is weak; this does not occur with the Argyll Robertson pupil. In a miotic Argyll Robertson pupil, the psychosensory dilator response is apt to be subnormal. Two opposing factors normally participate in this reflex, a sympathetic and a parasympathetic. A sympathetic stimulus is sent, via the cilio-spinal center and the cervical sympathetic, to the dilator iridis, causing this muscle to contract; and a parasympathetic stimulus is transmitted simultaneously, via the third nerve, to the sphincter iridis to cause it to relax, each stimulus producing, on its own account, a widening of the pupil. In the Argyll Robertson pupil, the sympathetic element is likely to be impaired, owing to spinal-cord involvement; this would reduce the psycho-sensory effect. In pupillotonia, the psycho-sensory reflex is normal. The Westphal-Piltz phenomenon shows nothing unusual in the presence of the Argyll Robertson pupil, but in pupillotonia the reaction may assume a tonic character. In pupillotonia, the pupil may vary in size and performance during the examination; the Argyll Robertson pupil does not behave in such manner. Cases of pupillotonia that have been observed for years, have at no time displayed any evidence of syphilitic infection; there were no familial nor degenerative stigmata, the blood and spinal fluid were repeatedly negative, visual fields and eye grounds normal, there was no palsy of the extrinsic ocular muscles, and the general skeletal musculature was unaffected. Accordingly, the writer agrees with Bramwell[10] *et al.*, that pupillotonia is a clinical entity of an innocent and innocuous nature. Syphilis of the nervous system that does not manifest, at any time, any signs or symptoms except pupillotonia and absent tendon reflexes, does not exist. Moore[11] reported under the

caption "Non-luetic Argyll Robertson pupil" a series of cases that doubtless belongs to the category of pupillotonia. In passing, one might mention the neurotonic pupillary reaction, a photomotor phenomenon analogous to the convergence reaction in pupillotonia. The cause of the neurotonic pupil and its explanation are obscure.

Instances of atypical pupillotonia have been diagnosed as the ocular sequelae of diphtheria. In diphtheria, there is usually the history of a specific infection, the ophthalmoplegia interna is commonly bilateral, and frequently limited to paralysis of the ciliary muscle, the symptoms appear a few weeks after the acute course has subsided, and, as a rule, there is a comparatively early complete recovery. The peculiar response of the pupil to convergence is absent. In addition, the pupil contracts to the near reflex to a less extent than normally, assuming that the innervation of the sphincter iridis is intact. In this connection, it may not be amiss to call attention to the physiology of the near reflex. When a person focuses upon a near object, there is a distinct contraction of the pupil caused by the acts of accommodation and convergence. In paralysis of accommodation alone, the pupil will still contract, although to a less extent. The same holds true in paralysis of convergence alone, as may occur in encephalitis lethargica. In paralysis of both accommodation and convergence, the near reflex is completely abolished. Thus the amount of contraction of the pupil to the near reflex is the sum of the contraction due to the accommodation plus that due to the convergence.

A case of diabetes may unexpectedly reveal absent knee jerks and pupils that do not react to light but do react to the near reflex. Such a case may be accompanied by some of the features of atypical pupillotonia.

Since pupillotonia appears in the standard textbooks under the title "The myotonic pupillary reaction," it seem pertinent to state briefly wherein it differs from those myopathies that are characterized by myotonic phenomena, particularly myotonia congenita or Thomsen's disease. In the various myotonic disorders, only the striped or voluntary muscles are involved, while in pupillotonia, the disturbed function affects smooth muscle. A patient afflicted with myotonia congenita has no difficulty in initiating any movement; there is no delay or latent period, contrary to what occurs in pupillotonia. It is true that in the myotonias, once the muscles contract, they remain in a spastic condition for some time; for example, when the eyes are closed, they can be opened only slowly and after the expenditure of much effort. Frequent repetition of the act causes a temporary recession of the disturbance. In pupillotonia repetition does not ameliorate the dysfunction. The pharmacologic test is of value. Quinine produces an immediate and spectacular, though short-lived, subsidence of the symptoms in myotonia congenita, but is inert in pupillotonia. In the myotonias, the deep reflexes are preserved and pupillary changes are uncommon. Conversely, in pupillotonia there is no involvement of the skeletal muscles. In the myotonias, the muscles themselves or their myo-neural junction is at fault; in pupillotonia, the anomaly is based upon a distant factor. In myotonia atrophica, presenile cataract is a frequent occurrence and may direct attention to the diagnosis of the myopathy. A pronounced sleepy look, owing to a drooping of the upper lid, is characteristic.

Adie's statement that pupillotonia is a disease *sui generis* is disputed by those who contend that cases of pupillotonia should be divided into two distinct groups: (1) pupillotonia appearing as the sole clinical manifestation in a healthy

individual, (2) pupillotonia as part of a general morbid state. It is to the first group, that the eponym "Adie's syndrome" may appropriately be applied, although much credit accrues to Behr for his thorough study of the subject, whose brilliant contributions were published 10 years before those of Adie. Pupillotonia has been reported in encephalitis lethargica, migraine, diphtheria, chronic alcoholism, contusion of the eyeball, cranial injuries, and herpes zoster ophthalmicus. Patients presenting Adie's syndrome in the above restricted sense, are mostly young females in good health with loss of the deep reflexes; while in the other group, there is no sex preference, areflexia is not a part of the clinical picture, and there is a recognizable extraocular disease in addition to the pupillary anomaly.

Regarding the etiology, pathology, and pathogenesis of pupillotonia, we have no definite knowledge; our views, at best, are merely speculative. Some believe that a neurotropic virus is the offending agent, others hold the view that a neurosis or a psychosis is at the bottom of the trouble, still others implicate the endocrines.

As to the site of the pathological process, again opinions differ. Saenger thought the muscles of the iris were primarily involved—that is, that the lesion was of a myopathic nature—a view that has few adherents. Many[12] are inclined to ascribe the disorder to a disturbance in certain parts of the third-nerve-nucleus district or cerebrad thereto. They hold that the vegetative nervous system sending impulses to the respective muscles via the parasympathetic is responsible for the disturbance. In about one third of the cases[13] there is additional evidence that the vegetative nervous system is implicated: vasomotor instability, and anomalies of perspiration and of skin temperature. Loss of deep reflexes has been observed in catalepsy, narcolepsy, family periodic paralysis, myasthenia gravis, the myopathies, Graves's disease, and other affections, conditions in which there is apparently no organic change in the reflex apparatus. Respecting the *modus operandi* of pupillotonia, Behr theorizes as follows: In the domain of the nucleus of the third nerve are parasympathetic cell groups that subserve accommodation and the photomotor and near reflexes. These cells have become or are inherently sluggish in action, and when stimulated there is no immediate response, the energy of the stimulus being stored up or accumulated in the cells. This energy is then slowly discharged, even after the stimulus is removed, thus accounting for the peculiar behavior of the pupil. There is a perversion of function, not due to any organic lesion, but rather dependent upon an abnormal physico-chemical change in nerve tissue.

The view that pupillotonia is a result of emotional instability, that it is of psychotic origin, or a neurosis, will not explain that the anomaly is unilateral, that it occurs in persons in sound physical and mental health, and that it persists, as a rule, unaltered over years of observation.

The following is a summary of the cases of two patients who have been under my care since August, 1937.

H. F., a white male, in good health, had a negative history. He had high myopia; his corrected vision, O.U. was 20/20. Ocular excursions were normal, as were also the visual fields and eye grounds. The right pupil was irregularly oval, the left pupil pear-shaped. In good daylight, the right pupil measured 3 mm. in diameter, the left 4 mm. Neither pupil reacted to light directly or consensually when examined in the usual way. However, after a sojourn of one-half hour in the dark room, the right pupil was 5 mm. wide, the left 4½ mm. Upon focus at 8 cm., after a latent period of 3 seconds, the right pupil contracted slowly to 2 mm.,

and then when the gaze was directed to distance, dilated leisurely, consuming 60 seconds before attaining its former size. The left pupil required 3 seconds to elapse before it responded to accommodation-convergence, contracted to 2½ mm., and remained thus contracted for 6 seconds after the removal of the stimulus, reaching full dilatation in 28 seconds. There was no associated accommodative spasm. The Westphal-Piltz and psychosensory reflexes were normal. In the course of the examination, the pupils would vary appreciably in size without any apparent reason. The tendon reflexes were absent.

I. F., a sister of H. F., 24 years old, unmarried, had a negative history. She also had a high myopia, and corrected vision was 20/20. Both pupils were dilated, the right to a greater degree. They were moderately irregular and eccentric; there were no synechiae. Neither pupil reacted to light directly or consensually, even after a prolonged stay in the dark. Typical tonic convergence reaction proved the pupils slow to respond; they remained contracted after removal of the stimulus, and then slowly dilated. Ankle and knee jerks were absent.

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SYPHILITIC OPTICOCHIASMATIC ARACHNOIDITIS*

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Basilar meningitis due to syphilis has been recognized for many years. Oppenheim, in 1911, stated that—"The chief form of brain syphilis is basal gummatous meningitis. It usually arises from the subarachnoid tissue in the region of the chiasma, from the space between the cerebral peduncles, and thence it extends more or less widely in a diffuse, although irregular, manner over the base of the brain. At some points, and often over a wide extent, it forms a firm, connective-tissue induration, which adheres firmly to the basal parts of the brain. It penetrates into all the bifurcations and depressions, and spreads like a veil over the origin of the cranial nerves. . . . The basal meningitic process may also be limited to a small area, *e.g.*, to the neighborhood of the oculomotor nerve, the chiasma, etc." The chiasm and other cranial nerves are bathed in cerebrospinal fluid as they traverse the various cisterns of the brain, the most important, from our viewpoint, being the cisterna chiasmatica and the cisterna interpeduncularis. The access thus provided for infection to reach the cranial nerves explains the early incidence of cranial-nerve palsies in the course of basilar meningitis. In addition to the nerves, innumerable blood vessels range through the cistern and thus carry the infective agent into the cerebrospinal fluid at these points. Gravity and cisternal stasis perhaps play a role in localizing the process at various areas. This would explain the predilection of the infective agent for the base of the brain and posterior fossa, the latter particularly from middle-ear disease.

It is well known that syphilis has a tendency to involve the crevices and folds of the central nervous system (Friedman, Brock, and Denker). The changes consist of an inflammatory exudation into the meninges, in which spirochetes are found, but especially in focal accumulations of cells in the meninges, particularly in the walls of blood vessels and in the adjacent substance of the brain itself (MacCallum).

Igersheimer (1918) terms the region of the optic chiasm the "Lieblingsitz," or "favorite seat," of basal syphilis, and discusses chiasmatic syphilis at great length. When other cranial nerves are involved, it is not difficult to recognize syphilitic basilar meningitis, but when the optic nerves and chiasm alone are implicated, the arachnoid nature of the syndrome of atrophy of the optic nerve and visual-field defects is frequently unsuspected or is mistaken for parenchymatous syphilis, that is, tabes dorsalis, as Hausman has pointed out. When all other chiasmal lesions—for example, (1) intrasellar lesions, (2) suprasellar lesions, and (3) parasellar lesions, including aneurysm of the circle of Willis, tumor of the optic chiasm or optic nerve, traumatic lesion of the optic chiasm, oxycephaly, and heredodegeneration—have been excluded, the underlying cause is arachnoiditis. Just as the nonsyphilitic cases of chiasmal arachnoiditis have shown improvement or recovery by surgical intervention, so arachnoiditis due to syphilis has yielded to surgery, with, in a few cases, improvement of vision. Modern neuro-surgery has revealed many lesions the nature of which has hitherto been entirely unsuspected. Among these is opticochiasmatic arachnoiditis. The nonsyphilitic form has been extensively studied, notably by Craig and

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Lillie, Heuer and Vail, Davidson, and especially by French investigators. A recent monograph on the subject by Bollack, David, and Puech analyzes at great length 129 surgically verified cases, and forms an exceedingly valuable contribution to the subject. Thirteen, or 10 percent, of these collected cases had positive blood and/or spinal-fluid Wassermann tests. Adhesions due to arachnoiditis involving the chiasm were found at operation, in all cases, and were freed as thoroughly as possible. It is pertinent here to analyze the postoperative visual result in these cases. Six showed no improvement; three became somewhat worse as time went on. All these cases, so far as preoperative vision was concerned, were practically hopeless. The postoperative result was considered good in two cases, the vision improving in one eye from zero to 1/50 in one case and from 5/7 to 5/5 in the other. Two cases showed slight visual improvement (from shadows to 1/100, and from 1/35 to 1/25). One case remained unchanged (5/50 both eyes). In one patient the postoperative visual result was not stated, and one patient died following operation. These results are not, to be sure, very encouraging, but the unfavorable outcome, as has been pointed out, occurred in patients in whom the optic nerves were very much atrophied, and in whom prognosis for recovery of useful vision could be regarded as positively hopeless.

Hausman has recently reported five cases of syphilitic arachnoiditis of the optic chiasm. One patient (case 1), a Negress, aged 26 years, had suffered severe intermittent headaches for four years, bilateral anosmia for three years, and progressive loss of vision for two years. There was almost complete blindness in the left eye, temporal hemianopia in the right eye, and bilateral primary atrophy of the optic nerve. The Wassermann reaction of the blood was 4+, and of the cerebrospinal fluid was negative. X-ray examination showed a shallow sella, with poorly outlined clinoid processes. Craniotomy with liberation of chiasmal adhesions was performed. Prompt improvement in the visual fields resulted, and one month after operation the vision had steadily improved in both eyes. Three patients were not operated upon, and intensive antisyphilitic treatment was of little benefit, only one case showing slight improvement. One patient died a year after coming under observation and treatment. Autopsy revealed a gumma of the right parietal lobe, and perichiasmal syphilitic plastic meningitis. Microscopically there was gummatous meningitis of the optic chiasm.

Bollack, David, and Puech believe that in certain cases the realm of opticochiasmatic arachnoiditis can be extended to include tabes. In other words, a tabetic person can have arachnoiditis. These observers quote Mme. Schiff-Wertheimer as follows: "We have seen that the meningitic lesion is not sufficient to explain the pathologic process that affects the nerve trunk. On the other hand, we have insisted on the frequent beginning of the lesions at the periphery of the nerve and believe that section of the meninges and the resultant drainage can have a favorable influence."

Recent studies by Greenfield and Epstein indicate that they corroborate the findings of Schiff-Wertheimer, Stargardt, Behr, and Igersheimer that chronic meningeal inflammation is the cause of tabetic optic atrophy. It was found that the superficial fibers in the optic nerve were affected first, that the myelin was affected more than the nerve fibers, and that inflammatory changes in the meninges were much more evident in the intracranial than in the intraorbital portion of the optic nerves.

David, Hartmann, and Hebert reported the case of a tabetic male, aged 48 years. In 1936 his vision, especially in the right eye, began to fail rapidly. The field of vision showed marked loss in the lower portion. The vision in the right eye was reduced to 2/10; in the left eye, to 3/10. Blood Wassermann and Kahn tests were strongly positive. Bilateral optic atrophy was present. Antiluetic treatment was administered, but six months later the fields of vision showed still further loss. Craniotomy and exposure of the chiasma revealed a widespread leptomeningitis extending over the entire frontal lobe. There were large white sheets of scar tissue on the sylvian fissure. The right optic nerve was concealed by an enormous white-banded sheet of tissue, suggesting a cystic membrane, from beneath which a large amount of fluid exuded. The optic nerves were freed carefully. Two months after the operation the vision in the right eye was 3/10; in the left eye, 5/10. The field of vision had improved.

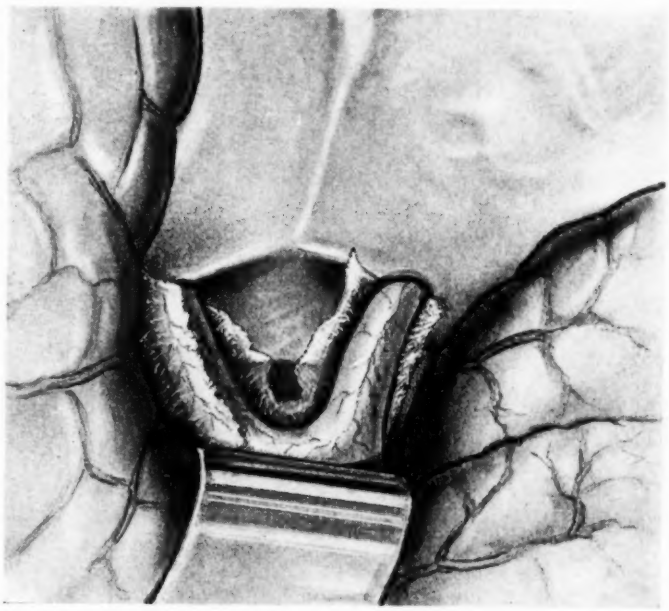

Fig. 1 (Vail). Exposure of right optic nerve (case 1).

Fasiani reported a case of tabes in which arachnoidal adhesions around the optic nerves were found and freed. (The details of this case are not available.) On the other hand, Sourdille and David reported a tabetic case in which operation did not disclose any arachnoidal adhesions. The two optic nerves were small, reddish gray, and were the seat of inflammation and atrophy. There was no basilar meningitis, but an enormous amount of fluid escaped from the chiasmal cistern. There was no postoperative improvement of vision, but, strange to say, the patient's ataxia improved remarkably, a fact that the authors cannot explain. The fields of vision were not typical of a chiasmal lesion, showing concentric contraction only.

Case reports

Case 1. W. F., white, male, aged 58 years, was first examined on March 2, 1938. He complained of poor vision, especially in the right eye, for at least five years, and probably longer. In November, 1930, he had struck the right part of his head, immediately after which he noticed that the vision in the right eye was poor. The left eye was normal at this time. He consulted an optician, who referred him to an ophthalmologist. Glasses were prescribed. At this time the vision in the left eye was normal, but no cause for the poor vision in the right eye was given. In 1933 he was seen by another ophthalmologist, who found primary optic atro-

phy in both eyes and diagnosed the condition as tabes. The pupils were moderately dilated and did not react to light nor consensually. Both discs were pale, but the right especially so. On August 29, 1933, the vision was: R.E., no light perception; L.E., 15/15, and J.6 with a +2.50 D. sph. added, indicating that there was probably a relative central scotoma. Wassermann was 2+; Kahn, 4+. Mercurial ointment and intravenous salvarsan medication were prescribed.

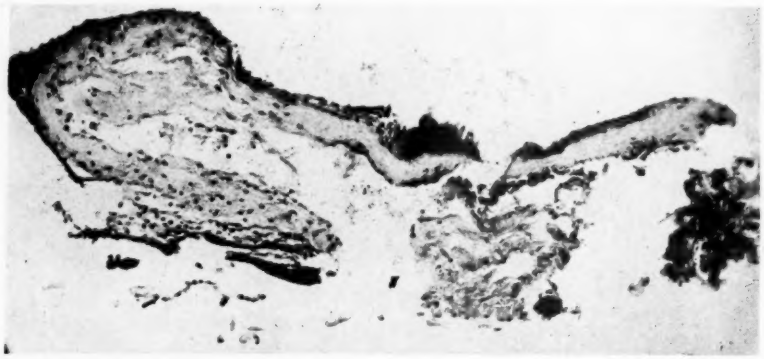

Fig. 2 (Vail). Fragment of arachnoid membrane removed at operation (case 1).

A year later the blood Wassermann was 4+. The vision in the left eye was reduced to 15/50, and a large central scotoma was found which the ophthalmologist believed was the result of the salvarsan injections. June 21, 1934, inhalations of amyl nitrite were given, the vision being 15/24 after the second inhalation and 15/19 after the third. Hypodermic injections of sulphuric oil and amyl-nitrite inhalations were prescribed during July and August, 1934. The final vision in the left eye was 15/19. The patient was not seen again until February 4, 1935, when the vision in the left eye had been reduced to 15/200. Unfortunately, the ophthalmologist had misplaced his fields of vision in this case. The patient reported that following the medication, particularly after the intravenous injections, he suffered severe headaches. At the General Hospital in 1935 he was given malarial treatment. He believed that his vision improved, or at least that it remained stationary for a time. Then it became steadily worse in the left eye until, on March 22, 1938, the vision in the left eye had been decreased to the ability to count fingers at three feet.

Examination: The right pupil was semidilated, did not react to light, but did react to accommodation. Ophthalmoscopic examination revealed the presence of a mixed type of optic atrophy: The outline of the nerve head was sharp, the blood vessels were markedly reduced, the lamina cribrosa was visible, and the color of the nerve head was a pale whitish green. In view of the patient's history, and what can be considered as adequate antiluetic treatment, a diagnosis of opticochiasmatic arachnoiditis was made, and the patient was referred to Dr. Howard McIntyre, a neurologist, who confirmed the diagnosis and advised craniotomy. On April 4th this was performed by Drs. Nolan Carter and Joseph Evans at the Good Samaritan Hospital. A right frontal lobe exposure was made, and an excellent view of the chiasm and the optic nerves was obtained. The cortex of the brain was covered with a thin, plastic membrane, which was

patchy and irregular.

Old exudate was deposited along the great vessels. The exposure of the chiasm revealed (fig. 1) a thin membrane, not unlike filter paper, covering the optic chiasm and the blood vessels. A piece of this membrane was removed for biopsy. An examination of the pathologic specimen revealed the presence of a thickened arachnoid with epithelioid cells and secondary fibrosis (fig. 2). The adhesions were much thicker and more numerous on the left optic nerve. In fact, on the first exposure of the left optic nerve it was thought that the nerve was shrunken to a thin thread, but careful dissection disclosed that this appearance was due to the membrane infringing on three fourths of the width of the nerve, to such an extent that the rest of the nerve was not visible. This membrane was resected and pushed back out of the way, revealing a normal-sized optic nerve (fig. 3) that was a little paler than usual. There was some flattening of the optic nerves as they entered the optic foramen. A large amount of clear fluid was evacuated from the cisterna chiasmatica.

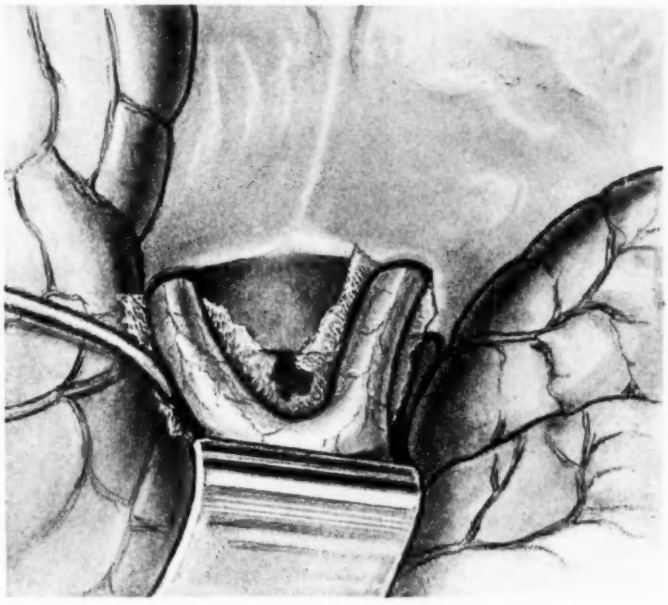

Fig. 3 (Vail). Exposure of left optic nerve (case 1).

The first few days after the operation were stormy, and because of secondary hemorrhage, the bone flap was elevated and a blood clot removed. After that the patient showed a steady improvement. The examination of the optic-nerve heads two days after operation showed no change. Apparently the vision had not changed either. On May 18, 1938, the right eye had no light perception, but with the left eye the patient could count fingers at 10 feet. There was good light projection in all parts of the field, especially in the temporal field, but doubtful in the center. The patient's wife stated that she had noticed a decided improvement in his ability to go about the house, although he did not think his vision had improved much, if any. The field of vision was as seen in figure 4.

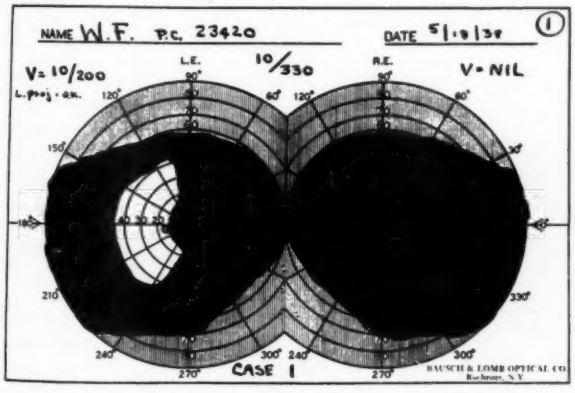

Fig. 4 (Vail). Field of vision (W. F., case 1).

Case 2. F. B., white, male,

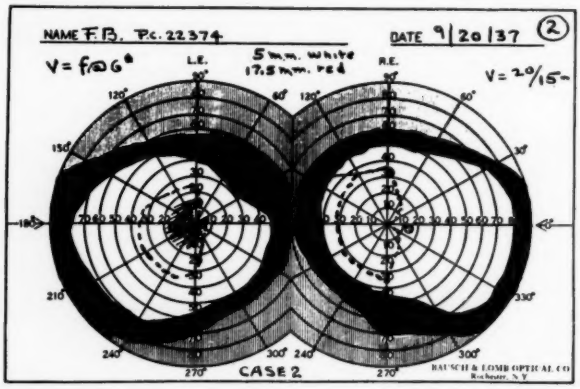

Fig. 5 (Vail). Field of vision (F. B., case 2).

aged 35 years, a salesman, was first examined on September 20, 1937, when he gave a history that the vision in the left eye had become poor one month previously. Everything seemed to be blurred, and vision gradually grew worse, so that he was no longer able to read with the left eye. There was no history of any inflammation or injury. His general health had always been considered good. He denied venereal infection.

Examination: Vision in the right eye was 20/15−1, and J.1; the eyeball was free of congestion, the pupil was of normal size and reacted somewhat sluggishly to light. The vitreous was clear; the optic-nerve head was sharply defined. The latter was very pale, with a visible lamina cribrosa and deep physiologic cupping. The vessels were somewhat constricted. With the left eye the patient counted fingers at six feet. The left pupil did not respond to light or accommodation. The disc outline was sharply defined, with deep physiologic cupping. The nerve head was very pale, and the vessels were markedly reduced in size. The biomicroscopic examination was negative. The fields of vision were as seen in figure 5. The patient was referred to Dr. Howard McIntyre for a neurologic examination. He found absent knee jerks, diminished abdominal reflexes, and slight ataxia, especially in the left leg. The Romberg sign was slightly positive. Pain sense was diminished from the first lumbar segment downward in the left leg; the vibratory sense was diminished in both legs. The spinal-fluid pressure was normal, and showed a positive Wassermann, 90 lymphocytes per cubic millimeter, luetic type of gold curve, and an excess of globulin. The blood Wassermann was likewise positive. A diagnosis of meningovascular lues was made, and the patient was placed on antiluetic treatment. On December 1, 1937, he returned. The vision in the right eye was reduced to 20/50−, and with the left he could count fingers at six feet. There was no change in the appearance of the disc. At a subsequent examination on December 21, 1937, vision was: R.E., 20/50; L.E., ability to count fingers at six feet. On February 7, 1938, vision in the right eye was reduced to 20/200, and in the left it was as before. Both discs were very pale, with a visible lamina cribrosa and marked vascular constriction, about equal in each eye. The vision with both eyes open was 20/200, and was a little better in

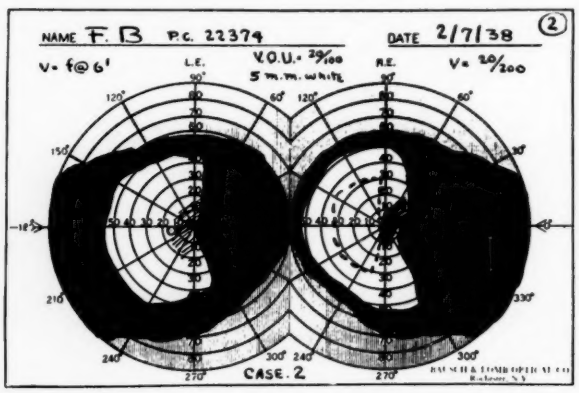

Fig. 6 (Vail). Field of vision (F. B., case 2).

dim illumination. The fields of vision are depicted in figure 6. On May 4, 1938, vision was: R.E., 20/200; L.E., ability to count fingers at 2½ feet on the temporal side. The nerve heads exhibited no change. A tentative diagnosis of chiasmal arachnoiditis was made, and operation was advised, but the patient refused to consider surgery. During these months active antiluetic treatment had been carried out, including 10 chills with malaria. The fields of vision were as seen in figure 7.

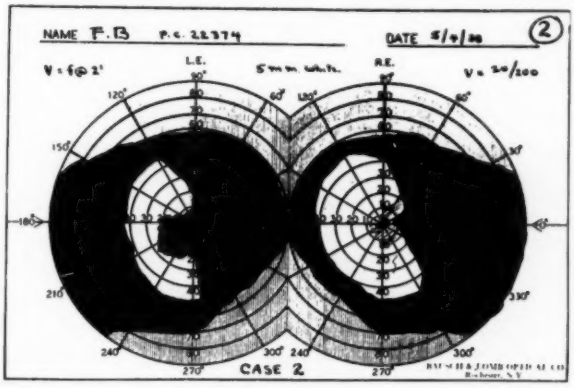

Fig. 7 (Vail). Field of vision (F. B., case 2).

Case 3. M.E., white, male, aged 61 years, was referred by Dr. N. A. Martin, Gallipolis, Ohio, in consultation. Dr. Martin reported that when he first saw the patient in October, 1937, the visual acuity in the left eye was reduced to the ability to detect hand movements at two feet, and the corrected vision in the right eye was 20/30. Both discs were pale, and there was marked constriction of the retinal vessels. The blood Wassermann was 4+. He was placed on antisyphilitic treatment, but in spite of this the visual loss was progressive. He was examined by me on February 14, 1938. He stated that two or three years previously the vision in his left eye had suddenly grown dim. At that time he was told by an ophthalmologist that he had had a hemorrhage in the eye, and that nothing could be done for him. Six months ago the vision in the right eye had begun to fail.

Examination: Vision in the right eye, uncorrected, was less than 20/200; corrected, 20/30+ and J.2. The pupil was slightly enlarged, but reacted sluggishly to light. The lens was clear, but the vitreous showed fine, dustlike opacities. The optic-nerve outline was sharply defined, with normal physiologic cupping and a visible lamina cribrosa. The entire optic nerve was pale, particularly on the temporal side. The vessels were markedly reduced in caliber and irregular. There were signs of vascular hypertension. An old, minute spot of focal choroiditis was present near the disc margin, below the temporal side. The palpebral fissure was more widely open than normal. In the left eye vision was reduced to light perception only—no projection. The pupil was dilated and fixed. The outline of the nerve head was somewhat pale and blurred. There was marked pallor of the nerve head, the lamina cribrosa was not visible, and the vessels were much reduced in size. The macular area appeared to be somewhat edematous, and was stippled with pigment as if it had been

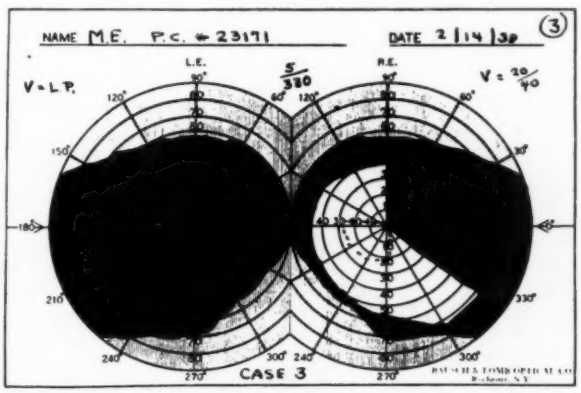

Fig. 8 (Vail). Field of vision (M. E., case 3).

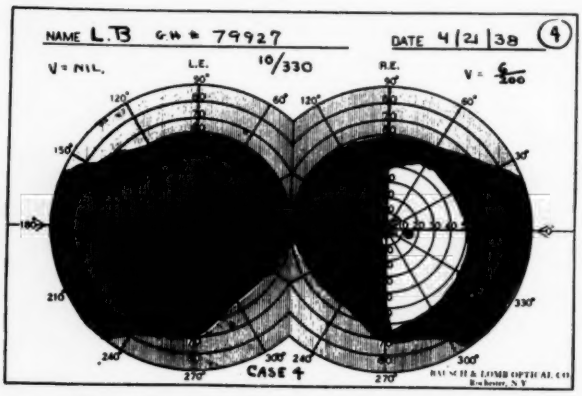

Fig. 9 (Vail). Field of vision (L. B., case 4).

the seat of an old macular hemorrhage. There was a new blood-vessel formation, and proliferative retinitis three disc-diameters from the edge of the disc along the superior temporal artery was present. The fields of vision are shown in figure 8. Malarial treatment was advised, with the understanding that if the progress of failing vision in the right eye were not checked, an exploratory operation of the chiasmatic area should be undertaken.

In a letter of April 8, 1938, Dr. Martin reported as follows: "His eye condition at the present time shows some increase of the visual field—the red target is well visualized over twice the area it was previously noted. He stood 12 severe chills with marked temperature reaction very well, and his general condition improved." Because of the improvement in his field of vision, the patient reasoned that operative interference should be undertaken only as a last resort after every other means had failed to help him.

Case 4. General Hospital No. 79927. L. B., colored, female, aged 27 years, was throughout 1934 a patient in the Branch Hospital, with a diagnosis of far-advanced pulmonary tuberculosis with cavitation in the right apex. She was discharged in 1935. In July, 1936, she complained of numbness of the face. Two days later her right side became paralyzed, and the left eyelid drooped partially. She developed headaches of a pounding, continuous character, deep in the left temporal region and above the eye. The headaches continued unchanged until September, when they subsided to a dull ache which gradually disappeared. One year later the headaches recurred, and the left eyelid again drooped. Her speech became mumbling. She said that her eyesight had always been poor, and that she had changed glasses frequently.

The physical examination was negative, except for evidence of an arrested tuberculosis at the right apex. The neurologic examination, made on September 30, 1937, showed complete left third-nerve paralysis and marked lower right side seventh-nerve weakness. The tendon reflexes on both sides were active. Blood examination: Kahn, 3+. Spinal fluid examination: Wassermann, 3+, positive gold curve, protein, 165 mg. per 100 c.c. Blood pressure, 100/72.

The ocular examination on April 13, 1938, showed vision in the right eye to be 6/200. The pupil was dilated, but reacted. The disc was pale, with sharp outline, visible lamina cribrosa, and the vessels were reduced in size. The left eye diverged about five degrees. The pupil was dilated, and did not respond to light. The disc was atrophic, with sharp outline, visible lamina cribrosa, and the vessels were reduced in caliber. Vision in this eye was reduced to no light perception. The vision in the right eye, with +3.75 D. sph. $\bigcirc\!\!\!\!\sim$ + 2.00 D. cyl. ax. 175°, was 20/70. The vision in the left eye could not be improved. The field of vision showed a sharply evident temporal defect (fig. 9). A diagnosis of syphilitic arachnoiditis and syphilitic thrombosis of the cerebral vessels with a bilateral mixed

type of optic atrophy was made. The patient had had inadequate antisyphilitic treatment, and it was considered wiser to try conservative treatment before undertaking surgery.

Case 5. General Hospital No. 43842. W. P., white, male, aged 64 years, had in February, 1937, noticed blurred vision of the right He exhibited no other symptoms except a chronic cough.

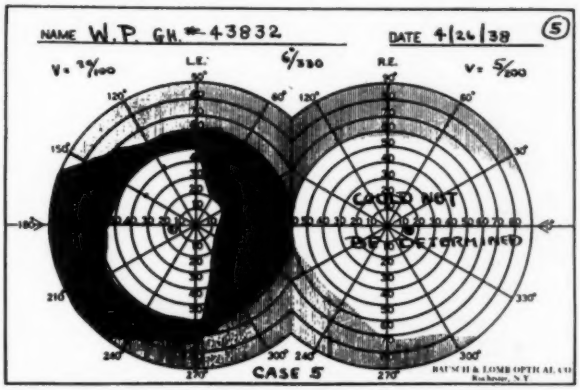

Fig. 10 (Vail). Field of vision (W. P., case 5).

Past history: In 1909 he had had an apoplectic stroke affecting the left side and causing diplopia. The paralysis subsided in 24 hours, but weakness persisted for six months. There was a history of chancre at the age of 19 or 20. He had received only four therapeutic injections. On March 11, 1937, the blood Wassermann was negative; the Kahn test was positive. The vision in the right eye was 5/200 unimproved, and the pupil did not react to light. The disc was very pale, with indistinct nasal border, and the vessels were markedly reduced in size; the color of the nerve head was white, and the lamina cribrosa was visible. The vision in the left eye, which had been 20/20 in 1937, was now reduced to 20/100; the pupil reacted sluggishly; the disc was slightly pale, with sharply defined border; the blood vessels were reduced in size, and the lamina cribrosa was visible. Blood pressure, 140/90. The field of vision is shown in figure 10.

Case 6. General Hospital No. 91810. A. H., colored, male, aged 42 years, first noticed dimness of vision in the right eye in February, 1938. One month later the vision in the left eye began to fail. He complained that at this time he could not see anything with the right eye. A history of chancre in 1929, gonorrhea in 1919, and again later, was given. He drank about one-half pint of "moonshine" daily from 1922 to 1929.

Physical examination: Blood pressure, 220/140. The motor and sensory systems were intact. The Kahn test and blood Wassermann were strongly positive. Spinal-fluid examination revealed a positive Wassermann and a positive gold curve. The vision in the right eye on March 30, 1938, was light perception only; in the left eye, it was 20/30. On May 16, 1938, the vision in the right eye showed no light perception, and in the left eye was reduced to detecting shadows and hand movements. The blood examination on April 12, 1938, disclosed hemoglobin, 13.8 mg.; red blood cells, 4,480,000; white blood cells, 4,750. The urine examination was negative. On April 20, 1938, examination of the right eye revealed a dilated pupil which reacted sluggishly. The disc was pale and yellow-white, with sharply defined border. There was a large temporal conus, with choroidal atrophy, visible lamina cribrosa, small arteries, and full veins. The left pupil was small and reacted actively. The disc was pale, and the lamina cribrosa was visible, with a deep, wide physiologic cupping to the temporal border. The arteries were somewhat reduced in size. The field of vision is shown in figure 11. A diagnosis of arachnoiditis affecting the optic chiasm was made, but an exploratory operation was not advised at

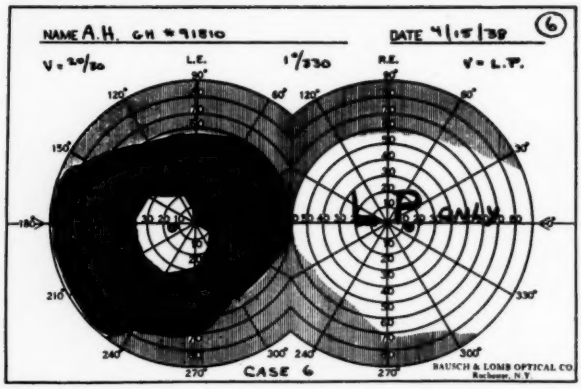

Fig. 11 (Vail). Field of vision (A. H., case 6).

the time, since it was believed that the antiluetic treatment had not been sufficiently carried out.

Case 7. W. C., colored, male, aged 55 years, stated that his vision had been failing for about one year, but he had not realized how bad it was until he was examined. There was no history of chancre or of antiluetic treatment.

An X-ray examination of the skull was negative. On April 26, 1938, the blood Kahn test was positive to desensitized antigen only, and lumbar puncture showed a clear fluid with a pressure of 160 mm.; cells, 130; Wassermann strongly positive; gold curve positive; protein, 99 mg. Neurologic examination was negative. A diagnosis of syphilis of the central nervous system, taboparesis, and syphilitic chiasmal arachnoiditis was made.

Ocular examination: Vision was: R.E., 4/200; the pupil was dilated and reacted sluggishly. The optic-nerve head was atrophied, white, and had a sharply defined outline and deep physiologic cupping; visible lamina cribrosa, and the arteries showed irregular narrowing, whereas the veins were of larger size than usual. Tension was 17 mm. Hg (Schiötz). Vision in the left eye was 20/100. The pupil was small and reacted well to light. The disc showed the same findings as in the right eye, except that it was a little paler. The ocular tension was 19 mm. Hg (Schiötz). Blood pressure, 175/110. The fields of vision were as seen in figure 12. The patient was given antisyphilitic treatment, with the understanding that if further loss of vision or fields occurred, an operation was to be performed.

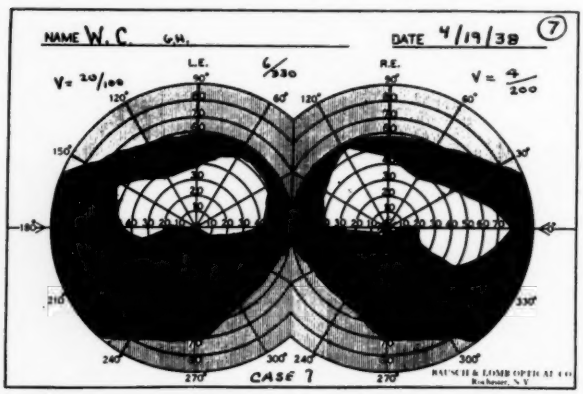

Fig. 12 (Vail). Field of vision (W. C., case 7).

Comment

These patients all show the four essential points necessary to arrive at a diagnosis of syphilitic opticochiasmatic arachnoiditis: (1) Rapid loss of vision; (2) chiasmatic field defects; (3) mixed type of optic atrophy; (4) a history of or positive serology of syphilis. The diagnosis in case 1 was substantiated at operation. The other patients will be kept under close observation, and with their consent will be operated upon if there is no improvement under conservative treatment.

Summary and conclusions

The literature on syphilitic opticochiasmatic arachnoiditis is reviewed, and seven additional cases, six of which are presumptive, are reported. Three of these cases were diagnosed by neurologists as of tabes or taboparesis.

A history of vascular lesions was obtained in two cases. The fields of vision showed defects that are considered to be characteristic of chiasmal involvement. Attention is directed to the mixed type of optic atrophy seen in all cases. The writer considers this type as one of the pathognomonic signs of chiasmatic arachnoiditis, and that it indicates a combination of simple atrophy and neuritis.

This study indicates that if neurosurgery is performed before it is too late improvement in vision may result. Hans Reese, neurologic editor of the 1937 Year Book of Neurology, Psychiatry, and Endocrinology, in commenting on Hausman's paper, says that: "The more acute syndromes of this entity should be treated medically prior to surgical intervention, whereas a damaged optic chiasm with progressive field defects (low-grade reactivity in blood and spinal fluid) should be treated at first surgically and thereafter medically."

Carew Tower.

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Discussion

Dr. Ralph I. Lloyd, Brooklyn: I am very much interested in Dr. Vail's paper, and particularly in the details of the autopsy and the operative findings in the anterior cistern about the chiasm. It seems to me that the specific cases considered as optic-nerve atrophy and ocular tabes are really of the type described by Dr. Vail. None of my cases has come to autopsy or operation, but perimetric examinations, if made early in the case, usually show that the original lesion first affects one nerve or tract, and later spreads to the chiasm. Progress is usually steady, and in some cases it is so rapid that the lesions must be vascular occlusions. If the case is seen late, the white disc, shriveled retinal arteries, poor vision, and very small and irregular fields compel one to diagnose the condition as optic-nerve atrophy.

As an example of what early perimetry will reveal, I wish to report the case of a man in his late fifties, who lost the vision of one eye over night. He denied specific infection until the Wassermann reaction was reported as 4+. He exhibited Argyll Robertson pupils. The infection had occurred 35 years before the first ocular symptoms appeared. He had been under the care of an oculist who also did nose and throat work, and Van

der Hoeve had just published his article showing that the enlarged blind-spot is a regular accompaniment of sinus disease. The ethmoidal cells on the affected side were exenterated and the removed tissue sent to a pathologist, who reported hyperplastic rhinitis, which was considered a satisfactory explanation of the sudden loss of vision. The visual field of the apparently normal left eye showed that the superior temporal quadrant was missing, which, with the other eye already blind, positively fixed the site of the lesion at the chiasm, but indicated also that the lesion had originally affected one nerve first and then spread later to the chiasm. The remaining portion of the temporal field (inferior quadrant) failed gradually during the next four weeks, by which time there was one blind eye and a temporal hemianopia in the other: very typical of a chiasmal lesion and often seen in pituitary disease. After a short interval, the macular area of the functioning nasal half of the field faded out, and in another month the second eye was also totally blind. The knee jerks were normal until the patient was blind in both eyes.

Another case of this type began with very poor vision in the left eye in a man in his forties, who had had specific infection about 15 or 20 years before. The visual field of this eye showed a sectorial defect above, but the macular area was seriously affected, reducing the vision to a low figure. The superior border of the field of vision of the apparently unaffected eye soon began to disappear, and the conclusion was that the optic nerve of the left side had been affected first and that the lesion had later spread to the chiasm, but all of this change occurred on the inferior surface. I was not able to follow the case further, but it undoubtedly was of the type which, when seen later, exhibits an altitudinal hemianopia but with very poor vision, since the macular area in these cases does not hold out as in cases of lesions behind the optic thalamus.

The general features of these cases are early pallor of the disc, steady—and often rapid—progress, early involvement of the macula, and, in the slower cases, bizarre visual fields. Many other nonspecific and nonpituitary cases that do not furnish a satisfactory etiology are much slower in development, with visual fields ranging from irregular binasal hemianopia to the contracted fields of optic atrophy, which can be explained only upon the basis of a similarly located disease, but up to the present time we have no exact details to settle this question. In older persons with similar visual-field defects, a satisfactory explanation is forthcoming. Considerable effort has been made to study these cases by autopsy and microscopy, with the result that the effect of pressure of sclerosed portions of the circle of Willis upon the chiasm, tract, and optic nerve is well understood. The anterior communicating artery has been found to cause a deep indentation in the superior aspect of the chiasm, and is the explanation offered for the early appearance of central scotomas because of the decussation of the macular bundles near the upper surface of the chiasm in the middle line.

Binasal hemianopia was shown by Herman Knapp to be the result of pressure of the posterior communicating arteries upon the optic tracts just behind the chiasm. Fuchs examined the brains of elderly persons and found amyloid bodies in the optic nerves with here and there patches of sclerosis. The amyloid bodies produced atrophy of the fiber bundles by direct pressure. In addition to these features, Fuchs found that the optic nerve was indented on the inner aspect, where it was pressed against the

sharp margin of the dura at the entrance to the optic canal, by the sclerosed ophthalmic artery.

The cases cited here occurred prior to the salvarsan period, and the question of the effect of arsenicals upon the optic nerve does not enter here. I hope Dr. Vail will give us more information on this subject, for we are sorely in need of exact knowledge concerning the pathology of the syphilitic lesions at the chiasm, and also as to the nonspecific and the nonpituitary cases.

Dr. Derrick Vail, closing: I am grateful to Dr. Lloyd for pointing out the progressive effect on the field of vision in these cases, from the beginning to the end. Chiasmatic field defects are well known, and nothing new has been added by my contribution, except to point out the importance of this area in certain lesions. Many other ramifications with which we did not deal might be considered; for example, the traumatic type of optico-chiasmatic arachnoiditis, and the suggestion that the optic atrophy of syphilis is due to the lesion arising in the chiasmatic cisterna affecting the optic nerve. Neither does the paper touch on the possibility that multiple sclerosis may have its origin in the chiasmatic area. It does not bring into the report the cases of Leber's disease that have been operated upon and in some of which arachnoidal membranes were found. It does take up, as Dr. Lloyd said, an entirely new field. I feel that Americans, in spite of the early work, particularly that of Cushing, have been a little remiss in not continuing their investigations. The French have taken over the field and have developed the subject extensively.

MANAGEMENT OF GLAUCOMA FOLLOWING CATARACT OPERATION*

B. Y. Alvis, M.D.
Saint Louis

It is the purpose of this essay to deal with the therapeutic management of glaucoma as a complication of the cataract operation. There is probably no problem in ophthalmology that taxes our ingenuity more than this. There is none that requires greater vigilance nor greater persistence. There is no rule by which one may predict the length of time a case may take nor the end result. A single fortunate prescription or operation may bring permanent cure, or one may run the gamut of medical and surgical measures only to see the vision fade and the eye come to enucleation for the relief of the intolerable pain.

No extended description of the clinical entity under consideration is necessary, since an excellent thesis by Fox[1] was published only a year ago, giving a comprehensive view of the subject.

However, a brief review of the essential points may be worth while.

The term *postoperative glaucoma* is a broad one and includes cases differing widely in many clinical aspects, such as pain, congestive symptoms, time of onset relative to operation, effect on vision, and so forth, but having the one common essential feature; namely, increased intraocular pressure.

The cases divide themselves roughly into two groups: one, including those that arise soon after the cataract extraction or needling, usually exhibits signs of acute congestive glaucoma of greater or less degree; the other, those that appear long, half a year or more, after the operation and usually follow a more or less quiet course resembling chronic or simple glaucoma.

Natanson[2] and others regarded the first group as comprising cases of secondary glaucoma arising as a result of operative imperfections, while the second, quiet group consisted of cases of primary glaucoma independent of the operative procedure.

As to etiology, there is general agreement that obstruction of the drainage angle is the essential causative factor. There are many operative and postoperative mishaps that may bring about such obstruction.

Vitreous entering the aqueous chamber, as noted by Bowman[3] in 1865, may be the cause. The rupture of the hyaloid membrane in needling a secondary capsular cataract, or in the course of an intracapsular extraction, or when there is vitreous loss, becomes a predisposing cause of glaucoma.

Graefe[4] noted rise of tension due to release of cortical remnants trapped in the collapsed capsule. He also mentioned ciliary irritation by traction on the zonula as leading to congestion and rise of tension. Plastic iritis with synechiae to the capsular remains has been the cause in many cases, as first noted by Priestley Smith.[5]

Adhesions of the lens capsule to the wound drawing the ciliary processes forward and closing the angle was demonstrated by Collins.[6] Iris adherent to or in the wound has been described by many

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* From the Department of Ophthalmology, Washington University. Read before the Saint Louis Ophthalmic Society, April 30, 1938.

and noted by all of us as a factor in causing glaucoma. Elschnig[7] was perhaps the first to note an ingrowth of epithelium through a badly coapted wound, lining the anterior chamber and closing the angle. Dupuy-Dutemps[8] mentioned a low-grade infection entering through imperfectly closed wounds as a source of ciliary congestion leading to rise of tension.

A scrutiny of these causative factors reveals each of them as a fault in technique. Dr. Hill Griffith asserted that glaucoma does not follow uncomplicated cataract extractions.

We have seen it follow in cases in which the operative and postoperative course was apparently uneventful, but one cannot be sure that no traction was exerted on the ciliary processes, leading to congestion and circulatory embarrassment.

One can be sure that an eye, after a clean-cut operation without adhesions of capsule or iris to the wound, with all cortex removed and incision firmly closed, is less liable to glaucoma than to other complications.

The pathology of postoperative glaucoma as revealed by microscopic study of enucleated eyes was carefully observed and described by Collins[6] in 1890 and by many others since then.

Naturally, no eyes have been thus studied in which the glaucoma yielded to treatment. These are the characteristic findings:

The anterior chamber is generally shallow. The lens capsule is found adherent to the operative cicatrix in those cases in which the capsule was not removed. When no capsule is present, the hyaloid membrane may be adherent to the corneal scar. After iritis, the capsule may be "converted into a thick membrane by inflammatory effusion" with the iris adherent to the membrane. Blocking of the angle of the anterior chamber occurs either by the root of the iris or by ciliary processes dragged forward by entangled shreds of capsule or vitreous. In inflammatory cases cell infiltration into the tissue of the iris and meshes of the ligamentum pectinatum is noted. The choroid may be much thickened by inflammatory infiltration. The retina may show cystic degeneration or occasionally detachment with fluid behind it. The optic nerve shows glaucomatous cupping except in the more recently inflammatory type, in which case it may be swollen and infiltrated with round cells. The vitreous usually is more fluid than normal and may contain remains of hemorrhages or inflammatory effusion.

That there is an inherent tendency to glaucoma in the majority of these cases must be seriously questioned, since in so many cases the fellow eyes are not especially liable to glaucoma whether operated on or not.

These pathological changes may bring about rise of tension in two ways. First, by increased formation of intraocular fluid as a result of drag on the ciliary body and processes; second, by blocking the angle of exit so that fluid is retained unduly in the cavum oculi.

That the presence of the capsular adhesions in the wound is not alone sufficient cause of glaucoma is shown by the fact that many cases in which adhesions exist show no rise of tension or have no attack until needling is done or some injury to the eye is suffered. Collins[6] suggests that this added insult is necessary to start the increase in formation of fluid beyond the rate of drainage. The herniation of the vitreous into the aqueous chamber where it can obstruct the drainage angle seems a more probable cause of the rise in pressure.

The incidence of glaucoma following

operation for cataract ranges around 1 percent. Collins studied the records of 1,405 cases at Moorfields and found nine cases or 0.64 percent. A. Knapp[9] reported 1 percent after primary extractions and 1 percent after discissions. DeGama Pinto[10] reported 2 percent of 326 needlings. Rennecke[11] and Cavara[12] both found equal incidence after combined and simple extractions.

Prevention

Turning to the clinical management of cases it seems important to give some thought to prevention. Since the underlying causes and pathological conditions are direct results of faulty or ill-chosen operative procedures it would seem worth while to study the operation with a view to avoiding these errors.

1. The incision is the most important feature of the operation. It should follow the corneoscleral junction and should have a conjunctival flap above to aid in coaptation of the margins. It must be ample in size.

2. Avoid loss of vitreous. One cannot secure a neatly closed wound free of capsule, iris, cortex, and vitreous if the latter is protruding through the wound. The actual vitreous substance lost is much less important than the complications of wound closure.

3. The question of iridectomy, complete, peripheral, preliminary, or simple extraction has been argued pro and con. Statistics of large reported series are not definitely favorable to any one method. Without question an intact iris with the angle free offers the best protection against entanglement of vitreous, capsule, and cortex in the wound. The difficulties of delivering the lens through a round pupil and of avoiding iris adhesions or even prolapse often more than outweigh these advantages. Unless the pupil dilates freely and well, I believe the complete iridectomy the safer procedure.

4. Intracapsular or extracapsular extraction presents another field of argument. Again it seems obvious that the complete removal of the lens favors an open angle and a wound free from adhesions, but if such a delivery can be accomplished only by an undue traction on the zonula, excessive pressure, and danger of vitreous loss, the gain is too dearly bought.

5. The toilet of the wound is a step of great importance in avoiding postoperative glaucoma. Great care in freeing the wound of all débris of capsule, iris, cortex, and clots in order to secure quick and accurate wound closure is entirely worth while. A large bubble of air injected into the anterior chamber at the close of the toilet is sometimes helpful in freeing the angle.

6. In capsulotomy a single, small, vertical cut through the membrane or a small inverted V opening made with a narrow knife needle with a tapered shank, so that vitreous will not be drawn into the corneal wound, should be made. The pitfalls here are the flooding of the anterior chamber with vitreous and the anterior synechia of hyaloid or capsule. A vitreous tag in the wound that easily escapes notice may lead to low-grade infection and congestion causing glaucoma.

The discission should be postponed until the eye is quiet. Use no atropine after needling unless iritis develops and the eye is soft.

7. The tension should be taken frequently in postoperative cases, and these should be kept under observation for some months if possible.

In general, prophylaxis is to keep the anterior chamber and filtration angle free and secure quiet postoperative healing, to avoid trauma to the ciliary body, and to

detect any tendency to a rise in tension before damage is done.

Treatment

The management of postoperative glaucoma calls for ingenuity and versatility and, above all, vigilance and persistence.

In the literature is recorded the use of practically every means that has been devised for the lowering of intraocular tension. No one measure has been attended with such outstanding success as to be considered a reliable cure for postoperative glaucoma. Where one fails, another may succeed. These measures may be divided into four general groups; namely, local medication, local physical therapy, general medication, and surgery.

1. Local medicaments are the miotics, the mydriatics, and the epinephrine preparations.

(a) The miotics, pilocarpine and eserine, appropriately head the list of local therapeutic agents. These are, after all, our most dependable agents. It is our practice to begin with pilocarpine 1 percent. Some cases respond at once with lowered tension. In most this response is only temporary and soon increasing strengths of pilocarpine (up to 5 percent) are necessary. If these do not aid, eserine is used, beginning with 0.5-percent solution. If eserine maintains lowered tension but must be used for a long period, an eserine sensitization develops. Eserine alkaloid in castor oil or in an ointment base may then be used. Even after surgical measures, one often must continue the miotics.

(b) The mydriatics—homatropine and atropine. In an occasional case with frank iritis these may reduce tension and lead to a cure, but must be handled with great caution.

(c) Epinephrine preparations—glaucosan, suprarenin bitartrate (a 2-percent solution or in ointment form) epinephrine 1/100, epinephrine 1/1000 as a pack are useful in certain cases of postcataract glaucoma. As a rule, in the acute or congested stage, the epinephrine preparations are not helpful. They may even cause severe pain and a further rise of tension. After the miotics have been used for some time, perhaps even after surgery and if the case has reached a stage with little congestion, when the tension remains up in spite of treatment, one may find this concentrated epinephrine surprisingly effective. One must be cautious at the beginning. Give the first treatment at the office or hospital where the tension can be measured after an hour or so. If the tension rises abruptly, a paracentesis should be done at once and eserine instilled. Even when effective, epinephrine is best used in conjunction with a miotic. I can, however, think of three patients who use only epinephrine 2 percent in water-soluble base, and only when they feel pain or blurring vision, indicating a rise of tension.

2. Local physical therapy includes heat, cold, and massage.

(a) Hot fomentations. Frequent and prolonged, this is the most useful of all nursing measures.

(b) Radiant heat. The infrared lamp, a simple 16 c.p. carbon filament bulb, any electric heating device may be the source. On ward service the infrared lamp is more apt to be applied as much and as often as ordered than moist heat which requires constant attendance of the nurse. Also radiant heat seems to penetrate deeper.

(c) Ice-cold applications. In occasional congestive cases cold may give greater relief from pain than heat, and should not be forgotten. Heat is more often useful.

(d) Massage of the eyeball may help to keep open an operative drain.

3. Constitutional medication.

(a) Ergotamine tartrate—intramuscular or oral administration of 1-mg. (1/60 gr.) doses has been recommended and seems to have been useful in some of our own cases.

(b) Calcium, gluconate or chloride. Both these medications are used for their effect on the sympathetic nervous system.

(c) Intravenous hypertonic solutions serve to withdraw fluid from the tissues and actually reduce intraocular tension. This effect is transitory lasting at most a few hours. This is useful as a preoperative measure.

(d) Purging and sweating fall in the same category and have not seemed worth while in our observation.

(e) Fever therapy may be useful where tension is secondary to uveitis. Typhoid bacilli are our choice, but milk or the hypertherm or hot baths may be used.

4. Surgical measures.

In the great majority of cases surgery is necessary. No one operation has found favor with any convincing majority of eye surgeons, but the following have the most success to their credit:

(a) Iridectomy. H. Knapp reported marked success in an early series of cases following simple extracapsular extraction. The general experience has not been so favorable especially in recent years.

(b) Cyclodialysis is considered the operation of choice in this particular type of glaucoma by Elschnig, Fuchs, Gradle, and others. It does serve to break up anterior synechiae of iris and capsule and doubtless is successful in many instances. It also is easy to do and does not mutilate the eye nor preclude subsequent operations by the same or other methods. Our own experience with this operation is not so satisfactory.

(c) Iris inclusion. This operation has grown largely in favor in recent years. Its simplicity and safety in execution and the permanency of drainage secured make it a valuable measure. Even when the immediate reduction of pressure may be insignificant or nil, the ultimate result may be good.

(d) Trephining, especially if done in an area where the iris has been undisturbed previously is successful in a fair proportion of cases.

(e) Sclerectomy or iridosclerectomy (Lagrange) or Berens irido-corneo-sclerectomy are operations to be considered.

This by no means exhausts the list of operative and conservative measures that have been employed but includes most of those that we have used.

Case reports

The following cases are presented in some detail to illustrate what actually has been done. Some have rewarded our efforts with success; others have not.

Mr. F. X. M., aged 39 years, had had an extracapsular extraction of the left eye on February 19, 1931, with peripheral iridectomy. Very little cortex remained, but the postoperative course was rather stormy. In six weeks the vision with correction was 15/16. Three months after operation the capsule was still rather thick and a capsulotomy was performed. Some cortical material was stirred up, but the vision cleared to 15/10 in one week and remained good for two years, when thickening of the capsule lowered the vision, and a second Ziegler capsulotomy was done on May 24, 1934. The wound in the cornea did not heal for several days (probably due to vitreous shreds dragged into the wound by the needle), but in one week the vision was 15/12; the eye quiet and soft. Three days later, on June 2, 1934, an acute attack of glaucoma occurred. The tension was 47 mm. Hg (Schiötz), and was reduced by pilocarpine 1 percent administered every two hours.

Thereafter the course was as follows:

Date	Tension mm. Hg	Treatment
June 6	18	Pilocarpine, twice daily.
8	52	Pilocarpine, every two hours.
9	37	
11	52	Pilocarpine, 4 percent, four times a day.
12	14	
14	47	Eserine 0.5 percent four times a day.
15	10	
25	16	No medication; massage.
July 6	30	Eserine, once daily.
Aug. 1	Acute attack	Cyclodialysis by Dr. H. S. Gradle. Pilocarpine three times daily brought tension to normal until.
Sept. 7	37	Suprarenin jelly, 2 percent, instilled; tension rose to 47 mm. Eserine 1 percent three times daily.
8	30	
10	18	Twelve hours after eserine.
Oct. 13	20	Using eserine irregularly.
27	40	Eserine prescribed three times daily.
30	18 at 8:30 A.M.	Four hours later.
	37	Eserine three times daily.
Nov. 19	18	
30	37	Iridotasis. Very little postoperative reaction.
Dec. 7	Normal to touch. Vision 15/12.	
15	+1 to touch	Eserine, 1 percent once.
26	22	

This patient has been seen occasionally since that time up to May, 1937. The tension remains normal with occasional instillation of eserine when he feels he needs it. The vision is normal as are the fields of vision.

Here, the iris inclusion seemed to be the solution.

As an illustration of those cases that refuse to yield to our best efforts, I cite the case of Mrs. E. D., aged 50 years, whose eye was needled two months after an extracapsular extraction. A considerable amount of cortical remains was liberated. There was an immediate rise of tension within 24 hours. In the two-and-a-half years that followed, this patient made 114 office visits; had 15 paracenteses of the cornea for temporary relief; had two iris-inclusion operations. She used pilocarpine and eserine solutions almost constantly besides hot packs, infrared heat, and massage locally; also saline elminations, iodides, salicylates, gynergin, thyroid extract, and bacterial antigens. She had teeth, gall bladder, and sinuses examined and treated. She had uveitis and arthritis as complications.

During this time the tension curve resembled a septic temperature chart ranging from 18 to 52, mostly about 30. At the end the eye was fairly quiet, tension 33 mm. Hg, and vision 5/60. The fellow eye remained normal throughout it all.

The next case is one in which persistent conservative treatment has been sufficient.

Mrs. W. H. S., aged 65 years, had a moderate rise of tension 14 days after intracapsular extraction. The operation and recovery were uneventful otherwise. Pilocarpine kept the tension low and in one month glasses were ordered; the vision being 5/5–.

Ten months later the vision was still 5/5, and the tension 47 mm. Hg. Pilocarpine 2 percent three times daily reduced the tension to a range of 16 to 20 and maintained it so with an occasional rise to 26 or 30. On January 7, 1936, the tension was 30 and suprarenin 2 percent in jelly was instilled, bringing the tension to 18 in 45 minutes. This preparation

alone used at night kept the tension low for the next six months, when it again rose to 33 mm. Hg. Pilocarpine three times daily was added and since then for one-and-one-half years, she has followed this routine fairly regularly. When she becomes careless and omits either the suprarenin or the pilocarpine for a few times, the tension rises and the vision gets blurry. The visual fields and central vision so far have not been impaired. The disc is not pale nor cupped. The other eye has a mature cataract but is otherwise apparently healthy.

The following case was an apparently uncomplicated intracapsular extraction with iridectomy which ran a smooth postoperative course. There was a mild striped keratitis and, two weeks after operation, a small bit of vitreous was visible at one point in the wound. This healed soon and one month after operation the vision was 5/5. Three weeks later, however, there was some pain and redness, and the vision was 5/15. Tension was 18 mm. Hg. The next week the patient reported with a tension of 52 mm. Hg.; cornea steamy; and vision 5/25. There had been pain in the head and nausea and vomiting. Two-percent pilocarpine with hot fomentations reduced the tension, and vision again became normal within three days. The tension rose again during the next three weeks and suprarenin jelly was used and ordered once daily with pilocarpine twice daily. There was no further rise in tension, and medication was gradually discontinued. When last seen, five months after the first rise of tension, the eye was quiet and tension 18 mm. Hg.

This was apparently a case in which the glaucoma was due to a low-grade infection which entered a small unclosed portion of the wound, leading to a congestion of the ciliary body which yielded to time, while the tension was held in check through the combined influence of suprarenin and pilocarpine.

A very recent case illustrates the necessity for a variety of therapeutic agents.

Mrs. W. C. B., aged 50 years, has had bilateral cataract extraction, extracapsular, with some adhesion of the capsule to the wound. The right eye was almost blind when trephining was done. The tension rose again in the right eye and shortly afterward in the left eye. The patient was highly nervous, and apprehension seemed to have brought about the attack in the left eye following a visit to her home oculist who had performed the operations. Eserine and pilocarpine were being used when I first saw her. The vision was ability to see hand motion in the right eye; 5/60 in the left; and the tension was above 100 mm. Hg.

Suprarenin bitartrate 2 percent in jelly was used in the office; after a wait of an hour, the tension dropped to 40 mm. in each eye and the vision of the left had improved to 5/15.

After three days of hospital rest, where suprarenin was used twice daily and pilocarpine 2 percent every two hours, the tension became and remained normal.

Two weeks later, following a visit to her home oculist who measured the tension as normal, the pressure again rose; this time medication and paracentesis failed to lower the tension permanently. Cyclodialysis was done, but the tension remained normal only a few weeks, even with medication, so an iridencleisis was performed on each eye. This time a slow rise in tension has been controlled by pilocarpine and eserine in the left eye; but the right eye, on her last visit, had tension of 40 mm. Suprarenin was again tried, and in one hour the tension was 18.

The prognosis of postcataract glaucoma is not good. Of the series reported by Fox, about one third had good to fair

vision, one third had poor vision, and one third had no vision. This agrees in a general way with our own experience. With the thorough coöperation of patient and eye physician, we can save some vision, in most of these eyes, for many years; some of them can be cured; and some of them will be lost.

As a final word, I repeat these thoughts. The best treatment is careful cataract surgery to avoid the complications that give rise to postcataract glaucoma; but once the attack comes, the utmost versatility and perseverance in treatment is required.

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METASTATIC SEPTIC ENDOPHTHALMITIS WITH RING ABSCESS OF THE CORNEA*

CASE REPORT, CLINICAL HISTORY, AND PATHOLOGIC ANATOMY

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Endogenous infection within the eyeball has been recognized as a disease entity for many years, but the interpretations of clinical observations and pathologic anatomy have varied considerably. Virchow[1] described endogenous infection of the retina in 1856, and stated that the choroid is not necessarily affected first. Purulent metastatic ophthalmia is a rapidly destructive disease, producing necrotic disintegration of the tissues within the eye, and usually terminating in panophthalmitis. A less malignant type of endogenous intraocular infection was first described by Roth[2] in 1872 and named "simple" septic retinitis. This observer wrote that septic retinitis is much more frequent in septic processes than is purulent metastatic ophthalmia, and that it is characterized by hemorrhages and small white, sharply circumscribed retinal foci which do not have a tendency to spread. He stated that the process is not due to emboli of pyogenic organisms in the retina, but to a chemical change in the blood dependent upon the sepsis. Probably those cases of metastatic ophthalmia which do not end in panophthalmitis are cases in which pyogenic bacteria do not enter the eyeball. Axenfeld,[3] while first assistant in the eye clinic at Marburg in 1894, wrote his classic treatise on purulent metastatic ophthalmia. In about one third of his cases the disease was bilateral. In the unilateral cases he found septic emboli often deposited in the uvea, but in the bilateral cases the retina was exclusively and predominantly infected. This simultaneous bilateral metastatic ophthalmia was usually the only demonstrable metastasis in the entire range of the carotid artery. He argued that it could, therefore, not have arisen from a general dissemination of coarse emboli-acting masses, since such masses must also have formed metastases in other places in the head and neck.

It seemed to Axenfeld most probable that in the bilateral as well as in a large number of the unilateral cases ocular infection occurred in the finest capillary branches, and that, therefore, there had been a general distribution of finely divided septic masses. Although bacteria were circulating in all branches of the carotid and ophthalmic arteries, selective localization occurred in the retina, and the orbitofacial distribution of the trunk vessel remained almost uniformly unaffected. He stated that a probable reason for the greater implication of the retina is the fact that the retinal capillaries are generally smaller than the choroidal capillaries, and that, unlike the choroidal capillaries, they are end arteries. He wrote that perhaps another reason for the involvement of certain capillaries, either of the retina or of the choroid, may have been the presence of areas of disease in the capillary walls favoring the lodgment there of microörganisms. Regarding the number of bacteria forming septic emboli, he recalled the fact that bacteria can increase in number after the death of the patient. Ulcerative endocarditis was found in about one third of Axenfeld's cases. Parsons,[4] writing of purulent ret-

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initis, said: "It is only possible to conjecture why the retina should be so particularly vulnerable." Collins[5] wrote: "Purulent retinitis may arise . . . from septic embolism in the retinal vessels. The retina becomes infiltrated with polymorphonuclear leucocytes, which make their way inward, collecting in large numbers between the retina and the hyaloid membrane and in the neighboring vitreous. . . . Septic emboli may also give rise to a nonsuppurative form of retinitis which is known as septic retinitis, in the same way as septic emboli may produce nonsuppurative forms of inflammation of the uveal tract."

In a more recent discussion of the subject, Schieck[6] stated that in "simple" retinitis septica (Roth) there are no emboli of bacteria and no blocking of the retinal arteries. This disease seems to be caused by toxins, and the prognosis is more favorable than in cases of septic metastatic endophthalmitis. He wrote that usually purulent metastatic retinitis progresses so rapidly to a clouding of the vitreous and then to an involvement of the anterior part of the eyeball that panophthalmitis soon occurs. Schieck asserted that the staphylococcus was sometimes the cause of metastatic endophthalmitis following surgical interference in other parts of the body. Colonies of bacteria are found in the retinal vessels and in the vitreous. The choroid is spared probably because of its collateral circulation, but the retinal arteries are end arteries and become plugged with emboli. In discussing the question of bacteria and toxins, he remarked that if, by the term sepsis, one means the presence of germs in the blood, it is quite possible that in one case only toxic products and in another viable organisms may be present in the retinal vessels, and that in the same eye at different times there may be an alternation of these two elements. He suggested also that the temporary state of immunity of the entire body and of the eyeball itself might be the decisive factor, and that variations in this fundamental condition might produce an exceptionally multiform disease picture. Metastatic septic ophthalmia and "simple" septic retinitis (Roth) could, therefore, be varieties of one and the same disease.

The case history which follows can properly be classified as that of a metastatic septic endophthalmitis or a purulent metastatic ophthalmia. A study of the pathologic anatomy in this case shows the presence of bacteria in the anterior chamber, the posterior chamber, and the vitreous. The retina, vitreous, ciliary body, iris, and cornea are infiltrated with pus cells. The choroid has not been involved. The ciliary body and the retina have been infected by septic embolism of their capillaries. The ciliary processes have been thoroughly disorganized and densely infiltrated with leucocytes. Toxins from the anterior chamber have infiltrated the cornea to produce a ring abscess.[7] Ring abscess of the cornea has not been described in some of the reports of purulent metastatic ophthalmia, but it may not be of rare occurrence. In such cases the cornea is invaded by toxins and polymorphonuclear leucocytes, and a characteristic annular infection occurs, with necrosis of the posterior corneal stroma. Basil Graves[8] has recently given an excellent description of this condition: "Ring abscess (peripheral annular infiltration), a serious purulent infiltration of the cornea, at first gray, then becoming yellow, may occur with rapid onset at the periphery of the cornea . . . in metastatic ophthalmia from focal sepsis. . . . The infiltration appears within a day in some cases, up to nearly two weeks in others, as a ring; usually complete, about 1.5 mm. wide, in most cases separated

from the limbus by an apparently clear interval which, in some cases, may be as much as 1.5 mm. wide. It is sometimes divided into two zones—an anterior in the stroma and a posterior between the stroma and Descemet's membrane. There is exudate in the anterior chamber of these cases, most of which go on to panophthalmitis. The probable explanation is that the cornea is secondarily attacked by a purulent iridocyclitis originating in local injury or in metastatic or general infections."

Case report

L. M., a male, aged 55 years, married, Italian, entered the De Paul Hospital on March 26, 1932, because of subacute suppurative otitis media of the right ear. The family history was unimportant, and his previous health had been excellent, except for repeated head colds. The general physical examination was negative. The routine ocular examination indicated no abnormality. Blood pressure and urine were normal. Stereo-X-ray examination of the mastoid regions "suggests inflammatory changes but no definite mastoiditis unless the development is very early." The patient's temperature remained normal. The leucocyte count was 6,250; Schilling differential count: Basophiles, 2 percent; eosinophiles, 4 percent; myelocytes, 0; jueniles, 0; stab cells, 8 percent; segmented cells, 47 percent; lymphocytes, 23 percent; and mononuclear leucocytes, 16 percent. The hemoglobin estimate was 75 percent. The treatment was symptomatic and palliative.

The patient was readmitted to the hospital on June 14, 1932, three months later, because of subacute mastoid inflammation on the right side. Blood examination: Leucocytes, 4,700; Schilling differential count: Basophiles, 0; eosinophiles, 1 percent; myelocytes, 0; juveniles, 0; stab cells, 7 percent; segmented cells, 68 percent; lymphocytes, 21 percent; mononuclear leucocytes, 3 percent; hemoglobin, 80 percent. A simple mastoid operation was performed by Dr. T. Lawton, whose notes read—"very large mastoid with tip cells necrotic and filled with yellow pus. All other cells were involved, with a large amount of granulation tissue and pus extending into the zygomatic process. The lateral sinus was exposed and found normal." Cultures from the right ear on two examinations showed no growth after 18 hours. The general physical examination revealed some cardiac enlargement and a complete "block." The eye examination disclosed no abnormality. After an uneventful operative recovery, the patient was discharged from the hospital June 21, 1932.

On January 24, 1933, six months after the mastoid operation, the patient was brought to the hospital in a semiconscious condition, complaining of generalized pains, headache, and a sore left eye. His son stated that the patient had never regained good health since the operation on his ear, and that one week prior to his present admission to the hospital he had become acutely ill, with severe pain in his back and legs; that two days ago his left eye became inflamed, but that vision in his right eye continued good. On examination, Cheyne-Stokes respiration, cardiac fibrillation, and mental stupor were noted. During the three days preceding his death his temperature ranged from 101° to 106°F.; his pulse rate, from 75 to 105; and his respiratory rate, from 26 to 48 a minute. The urine contained much albumin, a trace of acetone, no sugar, many red blood cells, and some hyaline casts. His red blood count was 3,660,000, and his leucocyte count rose from 11,500 to 17,600. The Schilling differential count, made several times, finally gave the following picture: Basophiles, 0; eosinophiles, 5 percent; myelo-

cytes, 5 percent; juveniles, 14 percent; stab sells, 32 percent; segmented cells, 19 percent; lymphocytes, 25 percent. The estimate of blood sugar was 91 mg., and of blood nonprotein nitrogen, 60 mg. On two examinations the blood culture was positive for staphylococcus after 12 hours. The right eye appeared to be normal. Vision in the left eye was only perception of light. The conjunctiva was injected and mucopurulent secretion was present. The surface epithelium near the lower limbus was roughened. The cornea was generally infiltrated, but not steamy. The pupil was about half dilated and round. The iris was cloudy, and several yellowish-white nodules were embedded in it. Exudate covered the anterior capsule of the crystalline lens and obscured the ophthalmoscopic view of the fundus. Intraocular tension was 40 mm. (McLean). The patient died on the third day, and an autopsy was performed by Dr. R. Thompson.

Fig. 1 (Tooker). Section through eyeball showing ring abscess of the cornea, swollen and disorganized ciliary processes, the accumulation of pus cells along the inner surface of the ciliary body and retina, particularly on the nasal side, and the considerable thickening of the retina just temporal to the optic nerve.

Autopsy report. Considerable hypostatic congestion was present in the lungs, and a diffuse purulent bronchial pneumonia was found in the left lung. The heart was enlarged, and the mitral and tricuspid valves were covered with small, fibrous vegetation. The stomach and intestines showed no gross pathologic changes. Many fresh infarcts were present in the spleen, and both kidneys contained numerous small infarcts, with pitting and scars of the capsule and a few small abscesses. The pus in these abscesses was of a thick, creamy consistency. The liver also contained several small infarcts that were apparently of recent origin. The brain was removed, and sclerotic adhesions were found surrounding the circle of Willis. The left eye was removed. On the left forearm, near the wrist, there was a large abscess, which was opened, releasing creamy, purulent material. The mastoid cells on the left were examined and found to be normal. Cultures from a kidney abscess showed staphylococci. Diagnosis: Septicemia.

Dr. Harvey D. Lamb, of the Department of Ophthalmology, Washington University Medical School, made the following report of the examination of the left eyeball:

Macroscopic findings: The eyeball was of normal size (fig. 1). The cornea showed a typical ring abscess (fig. 2), with the cellular infiltration involving centrally the anterior corneal lamellae. The anterior chamber was of normal

depth, and was filled with a finely granular detritus. The iris was largely necrotic, with much disintegration of the posterior pigmented epithelium. The ciliary processes were greatly swollen with inflammatory cells, and were necrotic (fig. 3). A thick layer of cellular exudate lay along the entire inner surface of the ciliary body, and became thinnest over the posterior end of the orbiculus ciliaris (fig. 1). Inflammatory material extended along the inner surface of the retina, being greatest on the nasal side and posteriorly. On the temporal side and posteriorly, the retina was very much thickened by inflammatory cells. The optic papilla was but mildly swollen.

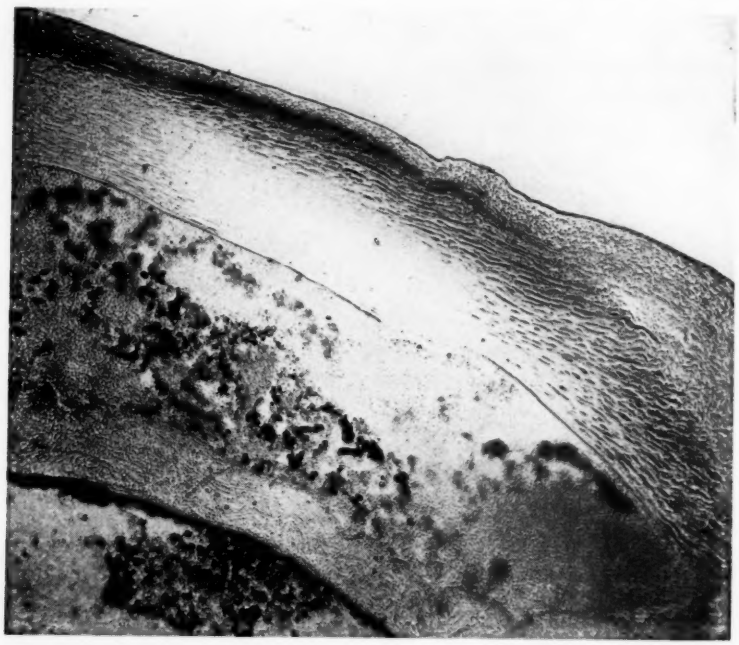

Fig. 2 (Tooker). Section through one side of the ring abscess of the cornea, with part of the anterior chamber, iris, and of the posterior chamber. In the cornea there appears the necrosis of the posterior lamellae of the substantial propria, with the anterior and peripheral zone of pus cells. In the anterior chamber there occurs the detritus from degenerated red blood cells, pus cells, groups of cocci, and loose pigmented cells from the pigmented epithelium of the iris. From the necrotic iris, loose pigmented epithelial cells have gathered in the posterior chamber.

Microscopic findings: The ring abscess of the cornea (fig. 2) was characterized by a necrosis of the posterior layers of the substantial propria, limited peripherally and anteriorly by a thick zone of dense numbers of polymorphonuclear neutrophile leucocytes or pus cells. The necrosis of the cornea had involved practically all the posterior endothelium, but had had but little effect upon Descemet's membrane. As is typical of ring abscess, the necrotic mass or sequestrum in the cornea was widest or extended more peripherally in the most posterior corneal lamellae. From this widest, posterior margin of the necrosis the latter gradually slanted anteriorly toward the corneal center. In this case, however, the necrosis did not extend to the anterior surface of the

cornea. The central area of the cornea, involving about one third of the diameter of the cornea, and including about one third of the thickness of the cornea, was densely infiltrated with pus cells. In this part of the cornea, however, Bowman's membrane was destroyed, although the nuclei of the corneal corpuscles of the infiltrated anterior corneal lamellae still stained well. Where Bowman's membrane was destroyed, the anterior epithelium of the cornea had proliferated posteriorly to fill the shallow depression remaining. The latter is the essential process in the formation of a corneal facet. The anterior epithelium was everywhere atrophic, degenerated, and thin; in a few places it had entirely desquamated. Numerous pus cells lay between the anterior corneal lamellae. Peripheral to the necrotic part of the cornea, the pus cells lay in thick layers between the corneal lamellae, pushing the latter widely apart. Posteriorly and internally the infiltration with pus cells ceased rather sharply. Anteriorly, pus cells in considerable numbers had infiltrated the anterior epithelium. Peripherally, the zone of pus cells corresponded in width to about one half the thickness of the cornea. Toward the margin of the cornea, the pus cells ceased quite abruptly, although single pus cells were fairly numerous as far as the sclera.

Fig. 3 (Tooker). Section through the anterior part of the ciliary body, ciliary processes, chamber angle, and base of the iris. The ciliary processes are necrotic, swollen with degenerated pus cells and fluid exudate, and ruptured internally, producing a compact mass of exudate on their inner surfaces. The anterior-internal angle of the ciliary body is swollen to a less marked degree with red blood cells and pus cells. The chamber angle is dilated with pus cells and red blood cells.

The detritus in the anterior chamber was derived from red blood cells. Scattered throughout it were numerous small groups of cocci, degenerated pus cells, and loose pigmented cells from the generally disintegrated pigmented epithelium of the iris (fig. 2). The chamber angles were dilated by degenerating pus cells. On the nasal side, numerous red blood cells lay in the chamber angle, whereas on the temporal side only a few red blood cells were observed. The source of this blood was plainly the anterior end of the ciliary body just external to the ciliary processes. Pus cells from the anterior chamber had invaded the filtration network and lay thickly between the trabeculae of the latter.

In the necrotic iris (fig. 2) there could be identified degenerated nuclei of chromatophores, the sphincter pupillae and dilator pupillae muscles, and thick-walled arteries. The pigmented epithelium of the iris lay in place only behind the pupillary zone on the temporal side. Here it was thickened considerably over the normal size and presented a little ectropion anterior to the margin of the pupil. On both sides, the pupillary end of the

sphincter pupillae muscle was also carried forward slightly. This thickening and ectropion of the pigmented iris epithelium, together with the ectropion of the sphincter pupillae muscle, must have been

Fig. 4 (Tooker). Section through flat or orbicular portion of ciliary body, presenting thick exudate of pus cells anteriorly, but very few posteriorly in the adjacent vitreous.

secondary to the atrophy of the iris that terminated in necrosis of that structure.

Just behind the iris, on the temporal side (fig. 2), there were numerous loose pigmented epithelial cells of the iris, intermingled with degenerated pus cells and a few small groups of cocci.

The lens exhibited some incipient cataract changes in the cortex adjacent to the equator, as shown by swelling and segmentation of the lens fibers. The anterior epithelium presented a uniform, mild proliferation and degeneration. On the free surface of the capsule, anteriorly, lay thin layers of pigmented epithelium from the iris, and in the region of the equator, single pigmented epithelial cells from the iris, degenerated pus cells, and small groups of cocci.

The ciliary body was most unique, with a metastatic involvement of the ciliary processes as ocularly primary as that in the retina. The ciliary processes were generally necrotic and much swollen with degenerated pus cells and fluid exudate (fig. 3). For the most part, the processes presented ruptures internally, resulting in a compact mass of degenerated pus cells, red blood cells, and large clumps of cocci in the adjacent posterior and vitreous chambers. External to the ciliary processes the anterior-internal angle of the ciliary body was also intensely infiltrated with albuminous fluid, red blood cells, and pus cells. The capillaries of the ciliary processes were here undoubtedly the seat of the septic process. The ciliary body generally presented a moderate degree of edematous swelling. Small hemorrhages in the vascular layer of the ciliary body were numerous. Posteriorly, the latter contained a small number of pus cells. On the temporal side, internal to the anterior half of the ciliary body, there occurred large numbers of pigmented epithelial cells from the iris, both singly and in small groups. Between these pigmented cells there were large numbers of degenerated pus cells and numerous groups of cocci. Internal to the posterior half of the ciliary body on the temporal side, and internal to the orbiculus or flat portion of the ciliary body on the nasal side, a thick layer of loose degenerated pus cells (fig. 4) was seen. Internal to the latter, on the nasal side, occurred several

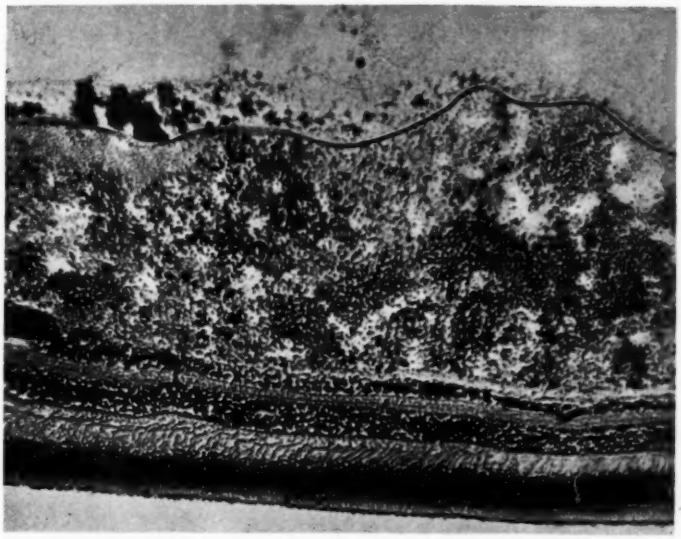

Fig. 5 (Tooker). Section through more swollen part of retina temporal to optic nerve, with numerous red blood cells, pus cells, and albuminous fluid infiltrating the inner retinal layers and large and small groups of cocci lying just internal to the internal limiting membrane of the retina.

small groups of cocci. The pus cells in the adjoining vitreous, opposite the posterior extremity of the ciliary body, were less numerous.

Of all parts of the eye, the retina was chiefly involved by the metastatic septic process. Almost every portion of the retina exhibited some degree of participation in this change, although the least amount of change occurred anteriorly on the temporal side. Here pus cells could be observed coming from the small blood-vessels and mildly infiltrating the nerve-fiber layer of the retina. In the adjoining vitreous pus cells were few, except adjacent to the anterior extremity of the retina, where they had wandered posteriorly from the ciliary body. On the temporal side, posterior to the equator of the eyeball, the septic process within the retina became more pronounced. For about 6 mm. temporal to the optic nerve

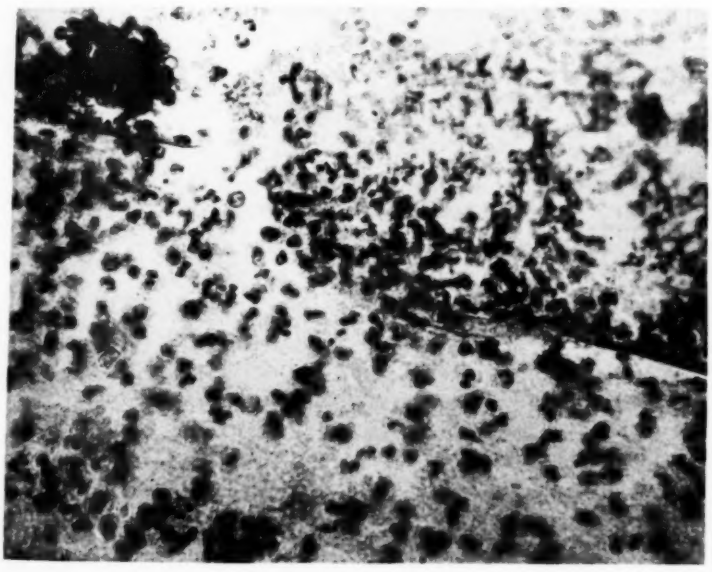

Fig. 6 (Tooker). Section through part of retina just nasal to the optic nerve, where pus cells are entering the vitreous through a rupture in the internal limiting membrane of the retina.

the greatest degree of inflammatory swelling in the retina was seen (fig. 5). Between the optic nerve and the central or foveal area, however, the changes were slight. In the foveal region the retina was very irregularly swollen in Henle's fiber and the ganglion-cell layer by albuminous fluid and red blood cells. Temporal to the foveal area, the swelling was confined to the layers internal to the internal plexiform layer; this was due to infiltration with pus and red blood cells. Internal to this thickened retina, temporal to the optic nerve, comparatively few pus cells, but many small groups of cocci, were seen. On the nasal side, the septic process in the retina was more uniform. Almost everywhere on this side pus cells were seen coming from the blood vessels. The infiltration of the nerve-fiber layer with pus cells was moderate in degree from the ora serrata to the equator, then it practically disappeared behind the equator to become intense just nasal to the optic nerve. At the latter place could be observed ruptures of the internal limiting membrane by pus cells coming from the retina (fig. 6). On this side the retina was abnormally thick only near the optic nerve. Internal to the retina, between the ora serrata and the equator on the temporal side, lay comparatively few pus cells but numerous groups of cocci (fig. 5). Just behind the ora serrata, on the nasal side, the retina over a small area was necrotic and ruptured. This unused anterior end of the retina is always thin and atrophic. At this point, the purulent process was mild in degree, and therefore one is led to conclude that toxins from the numerous cocci in the adjacent vitreous had here destroyed the retina, perhaps after death. Near the optic nerve on this side were moderate numbers of pus cells and a few small groups of cocci.

The choroid on both side, between the optic nerve and the equator of the eye, was slightly thickened with edematous fluid and infiltrated with numbers of loose plasma cells.

The optic papilla was somewhat swollen with edematous fluid. Its small blood vessels were seen to be the source of pus cells which were principally congregating in moderate numbers on the anterior surface of the papilla. No inflammatory cells were present in the optic nerve behind the cribriform plate, in its meninges, or in the subdural space.

Anteriorly in the vitreous, posterior and posterolateral to the lens, there were present a few degenerated pus cells and many collections of cocci. Posteriorly in the vitreous there occurred small numbers of pus cells, extensive networks of fibrin, and many groups of cocci.

Summary

All the changes in the eyeball are secondary to the ocular primary foci in the retina and the ciliary processes. Emboli of bacteria must first have lodged in the capillaries of the retina and in those of the ciliary processes. It is unusual to have two distinct primary foci in the same eye, thus involving the retinal and ciliary vascular systems, although but a very small part of the latter is concerned. From the capillaries of the retina and ciliary body the bacteria easily enter the vitreous chamber. Here, by chemotactic action, they produce infiltration of the retina and to a small extent of the ciliary body with pus cells and the exudation of pus cells from the ciliary body, retina, and optic papilla into the vitreous. The ring abscess of the cornea and necrosis of the iris are, of course, secondary to toxins coming from the vitreous. As Axenfeld pointed out, a post-mortem increase of the bacteria would seem to be the most probable explanation of their large number within the eye.

Comment

The development of a septicemia six months after a mastoid operation would probably warrant the belief that the primary focus of infection was not the mastoid disease, and additional doubt is raised because of the fact that the cultures made from the mastoid at the time of the operation were negative. The patient was examined thoroughly, however, on several occasions, and no other focus of infection was discovered. It may be assumed, therefore, that the primary infection was probably in the mastoid cells. At the time of the patient's last illness the picture of septicemia was complete, and whatever the primary source of the staphylococcus septicemia the endophthalmitis may logically be considered to have been a complication of this septicemia. The vegetative endocarditis found at autopsy reminds one of Axenfeld's observation regarding the frequency of this condition in his series of cases. Clinically, the right eye was normal, but if the patient had lived longer this eye would also probably have become infected. The loss of the corneal epithelium in the lower part of the left cornea was no doubt due to exposure during the several days that the patient was unconscious. An unusual feature of the case was the presence of two primary ocular metastatic areas—one in the retina and one in the ciliary body of the same eye. The choroid contained some plasma cells and edematous fluid, but it was not otherwise affected by the purulent metastatic process.

I am indebted to the Laboratory for Ophthalmic Pathology, Washington University School of Medicine, for the preparation of the sections and the illustrations in this paper.

Carleton Building.

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THE TREATMENT OF GLAUCOMA WITH SPLENIC EXTRACT

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Splenic extract was first used hypodermically in the treatment of eczema by Docents Mayr and Moncorps, of Munich, Germany, and their work was reported by their superior, Professor Leo Von Zumbusch.[1] These investigators attempted to supply the economy of eczematous patients with the secretion which their spleens failed to produce. They assumed splenic insufficiency to be the cause of this dermatosis, for the reason that eczematous patients and splenectomized animals both have eosinophilia. By means of this treatment they were able to cure long-standing cases that had resisted every other known form of treatment. In their opinion, the eosinophilia was merely an index of some underlying cause, as yet undiscovered.

Numerous articles soon appeared in French and German literature.[2] The results reported varied, but none of the writers were enthusiastic. This is due to the fact that clinicians obviously had not yet learned that the therapeutic efficacy of an organ extract is seldom, if ever, expressed by the number of grams represented by each cubic centimeter. Until a biologic standard is established for splenic extract, the results obtained by one clinician should not be contrasted with those reported by another unless both writers have used an extract made by the same laboratory, and, better still, from the same batch. The French writers especially, emphasized the fact that they use an extract of extremely high concentration.

In this country, Paul[3] claimed that an extract made by an American commercial laboratory would cause the intense symptoms of both cutaneous and respiratory allergic diseases to vanish within 20 minutes after the first injection; that some cases required no further treatment; and that most patients permanently recovered in one or two months. In one case, deafness, "caused by eczematous thickening of the cutaneous layer of the tympanic membrane," disappeared together with a similar involvement of the skin of the external ears. Three women's dysmenorrheas disappeared while being treated for eczema with splenic extract; "the annihilation of an allergic obstruction of the cervical canal, similar to the removal of such obstructions in the bronchioles in cases of asthma," is the explanation offered. In numerous cases, gastric disturbances, anorexia, and inability to tolerate certain foods disappeared; "coincident to recovery from 'eczema of the gastric mucosa' and eczema of the cutaneous surface" is the reasonable explanation. This observer appropriately asks: "Since eczema of the skin occurs without gastric involvement, if the gastric mucosa alone was the site attacked, could a gastro-enterologist make such a diagnosis?" "Such unlooked-for results," Paul states, "prove that eczema, like syphilis, is more than skin deep."

In consequence of a patient's permanent recovery from migraine while under treatment for urticaria, Paul concluded that the cephalalgia must have resulted from the pressure of the allergic edema of the brain against the rigid cranial walls. Later it occurred to him that a duplication of this phenomenon occurred in glaucoma, the only difference being that the angioneurotic edema, developing within the eyeball, meets the resistance of the inelastic sclerocorneal envelope.

The above theory sounded fantastic

when first expounded to me by this dermatologist, and my suspicions were intensified when he stated that this idea had been thrust among his meandering thoughts by his subconscious mind, when almost asleep after retiring. It happened that, at this time, I had a patient with glaucoma who was not responding to eserine, ephedrine, and pilocarpine, and would not submit to operative interference. I consented to this therapy after being thoroughly harangued by my colleague, as to how perfectly sure he was that glaucoma was simply intraocular angioneurotic edema, and how he had seen similar swellings on the cutaneous surface vanish in 20 minutes. He said that, at the very worst, the treatment could merely fail to benefit the patient, and that his statements were based on the treatment of over 300 cases during the preceding six years. I knew, moreover, that the patient would go blind if something was not done.

Magitot believed glaucoma to be a simple, or angioneurotic, type of edema within the eyeball. He thought this edema, in turn, was due to excessive capillary permeability. I gained this information from an exhaustive monograph by Luedde[4] which confirmed what I learned from Paul. Since Magitot's papers[5] appeared in 1929, and Paul had begun to treat dermatoses with splenic extract over a year previously, it is obvious that the idea that glaucoma is an intraocular edema must have developed in Paul's mind in the manner described by him. Had he merely learned it by reading Magitot's papers, he would have immediately suggested the trial of this treatment, instead of waiting five years before bringing it to my attention. It is needless to point out that by an attempt to deal with glaucoma as an allergic disease in the orthodox way, irreparable damage would be done while dawdling with skin tests and elimination diets.

Each day this patient, therefore, went to Paul, received his injection, and then came to me for observation of results. I am frank to admit that I hesitated to give the voluminous doses myself.* This patient had been taking 4 to 12 aspirin tablets every night and trying to sleep in a rocking chair because his pain increased on lying down. Immediately after the first injection there was a marked decrease in pain and reduction in intraocular pressure. Injections were given daily, and in five days the pain had completely disappeared. Treatment was started June 28, 1934, and the patient had fully recovered by July 30, 1934. During this time he received 12 injections. Within the following five months he had several mild recurrences, each of which quickly disappeared under one to three additional injections. The glaucoma involved his left eye, and he also had a cataract in his right eye. This patient was presented before the Buchanan County, Missouri, Medical Society on October 3, 1934, and a description of his case was subsequently published.[6]

The second case was of a 74-year-old woman, a former brothel keeper, about to die with cardiorenal disease, accompanied with severe edema. Paul gave her some of the first injections and she completely recovered from her glaucoma before her demise.

Such results completely destroyed my natural resentment to receiving instructions from a dermatologist, and thereafter I gave the injections of splenic extract myself. While the first treatments, given without Paul's supervision, were not unaccompanied with misgivings, I soon learned—as claimed by my colleague—that splenic extract is as harmless as it is effective. In arriving at this conclusion, I was not unmindful of Paul's statement

* It was 20 cubic centimeters of 40-percent splenic extract (Armour's).[6]

that he had treated over 300 patients for cutaneous and respiratory allergic diseases, during a period of over six years, without a single unfavorable reaction of any kind, before seeking my aid on account of his inability to diagnose glaucoma and evaluate the effects of this treatment.

Including the two cases just reported, I have treated 22 patients with splenic extract to date. Two of these showed marked decrease in tension, before deciding to place themselves in the hands of other ophthalmologists who performed iridectomies. In a third case, a peripheral iridectomy was performed for the reason that the increased tension returned as soon as treatment was discontinued, and despite the patient's having received numerous injections. The ultimate result, in this patient, was restoration of normal vision and tension.

Four of these patients had cataract with secondary glaucoma. Their prompt response to splenic extract proved that secondary glaucoma is amenable to this treatment. The advantage of reducing the tension in such cases before operation is obvious. Two patients presented themselves so late that partial optic atrophy was already present. A decrease in intraocular tension promptly followed treatment in both; but, of course, this did not clear up the scotomata in their fields.

The right eye of one patient had been operated on for glaucoma by a competent ophthalmologist, several years before I was consulted. Vision for form and light only was retained. The tension in the left eye, for which the patient consulted me, promptly subsided under splenic extract, and she has had no return of symptoms for two years. One patient's syphilis did not militate against prompt recovery under this treatment. Another patient's glaucoma quickly yielded to treatment, despite arterial hypertension and obesity. A patient with swollen lenses, secondary glaucoma, and diabetes, who reacted poorly to eserine, ephedrine, and pilocarpine, responded immediately to splenic extract, although tension was permanently controlled and vision remained normal only after prolonged treatment.

A few particles of steel in a man's eyeball, acquired during the World War, caused a chronic secondary glaucoma. Two ophthalmologists advised enucleation. Splenic extract keeps the tension at, or near, normal if constantly used. He is a traveling salesman, carries a supply in his grip, and receives injections from physicians in the towns he visits. A patient who developed glaucoma after smallpox, completely recovered after four injections. One patent's tension slightly increased after the first injection. The second treatment reduced it to normal. She came to me very recently, and at this date the outlook is that she will completely recover under a few injections. This case is an illustration of Paul's "Jahrisch-Herxheimer-like reaction," hereafter described.

A patient, whose tension remained normal after several injections, had a recurrence each time he went on a spree. This case supports Paul's claim that alcoholic beverages completely nullify the effects of this treatment. In such cases the ingested alcohol neutralizes the secretion of the patient's own spleen after treatment has been discontinued. A case fully illustrating this fact is described in one of Paul's papers.[7] Three patients discontinued treatment too early to enable me to decide if they had completely recovered. In each case, the tension came down promptly after the first injection. Fear of the hypodermic needle may have been the reason for their disappearance.

At the time Paul gave his first injection of splenic extract, February 25, 1928, methods of fractional extraction and the importance of biologic standardization

were not generally known. For this reason, most clinicians, and among them Paul, did not understand that an ampoule might contain an extract that was therapeutically worthless, despite its label's statement that it was obtained from a given organ. To use this dermatologist's own language, "It was owing to the fact that I reasoned, 'Splenic extract is splenic extract, and if I do not get good effects it is merely because I have given an inadequate dose!' Therefore, as a result of my ignorance of the possible absence of the curative fraction, I learned that the extract I was using was not only harmless but highly potent if given in a seemingly large quantity."

By cautiously increasing the amount injected, this clinician concluded that a dose of less than 20 c.c. is often ineffective, though 30 c.c. will cause no untoward reaction. He also learned that children seemed to have a tolerance for it out of proportion to their age. A newborn child will have no bad effects from a dose of 3 c.c.; 5 c.c. can be given to a 3-months-old baby, and a full adult dose to a 15-year-old child.

The extract we use is probably the weakest on the American market; it is the one used in the very beginning by Paul, and thoroughly deproteinized in order to obviate allergic shock. The voluminous dose required is fully compensated for by its clinical effects. We use a 10-c.c. Luerlock syringe to prevent the needle from slipping during the injection, and a 22-gauge needle for the reason that one with a smaller bore requires too much time to draw up and expel the voluminous dose. Ten cubic centimeters is given in each upper arm because an edema, lasting several days, sometimes ensues if the entire 20 c.c. is given in one arm. Paul has given the extract four times intravenously; in three cases there were no bad effects, but in the fourth cases, a severe general reaction, beginning one hour after the injection and lasting five hours, ensued. The patient made a complete recovery. An injection of 10 c.c. into each buttock prevented a patient from lying on her back the two following nights.

Injections are given at 48-hour intervals, unless symptoms recur sooner; in rare cases it may be necessary to shorten the interval to every 12 hours. As soon as symptoms indicate that the patient has fully recovered, a few injections are given at the usual 48-hour interval, as an insurance against recurrence, and then the time between the treatments is progressively increased, because we have learned this diminishes the likelihood of a return of symptoms.

During, or immediately after, an injection, a patient may faint. This is due to fright more often than to pain. Rarely a transient feeling of vertigo may supervene. For these reasons the patient should be either placed in the recumbent position, or seated on a table where such a position can be readily assumed. Elevation of the feet and a little time are all the treatment needed in any case. Indulgence in alcoholic beverages should be strictly forbidden. Careful inquiry should be made as to the nature of any liquid medicine the patient may be taking. The ingestion of even the smallest amount of alcohol definitely neutralizes the therapeutic effects of splenic extract.

Paul describes what he conveniently terms "A Jahrisch-Herxheimer-like reaction." This consists of a marked intensification of symptoms following the first and, perhaps, also the second and third injection. It is a favorable sign, for such patients almost invariably recover. According to his statistics, based on over 600 cases to date, it occurs in a little less than two percent of cases. In five cases of angioneurotic edema, in all of which there was recovery, this phenomenon occurred

in only one case. He points out that it is the one thing he greatly fears in glaucoma, for if an injection of splenic extract would produce such an effect in the eye, the patient's only hope would be immediate operative interference.

This treatment is in its infancy; only the results obtained by a large number of ophthalmologists, over a considerable period of time, will establish its therapeutic value. Laboratory study, for the purpose of trying to discover the principle underlying the action of splenic extract, and, if possible, to establish a biologic standard for it, should be undertaken.

Conclusions

1. Primary glaucoma is an angioneurotic edema within the eyeball, just as migraine is an angioneurotic edema of the brain. This is proved by the prompt relief of symptoms and reduction of intraocular pressure following the injection of a deproteinized extract of hog spleen.

2. The only reaction to be feared from this treatment is an intensification of symptoms, sometimes following an injection. Such reactions have been observed in cases of asthma, angioneurotic edema, urticaria, and eczema.

3. Continuation of this treatment will result in permanent recovery in most cases.

4. The danger of opening the eyeball under high tension is greatly reduced in cases demanding operation despite this treatment.

5. Therapeutic effects are not in proportion to the degree of the splenic extract's concentration, and favorable results can be obtained only if the extract happens to contain the curative element.

6. There is a crying need for laboratory investigation which might discover the physiologic action of this remedy, as well as a means of biologically standardizing it.

Kirkpatrick Building.

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NOTES, CASES, INSTRUMENTS

A SPECIAL SOLVENT DISPENSER FOR THE REMOVAL OF ADHESIVE-PLASTER DRESSINGS

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The removal of adhesive plaster from the skin is always a disagreeable task, particularly from a sensitive area like the face. In eye dressings this discomfort may cause squeezing, crying, or loss of confidence, particularly in children. It can be easily prevented by using a few drops of adhesive solvent, providing the solvent is at hand on the dressing tray. In my experience it usually is not. Benzene sponges are not efficient. Moistened applicators are better, but are seldom at hand. Application of solvents by a medicine dropper cannot be controlled, since the caliber of the pipette is too large to handle thin fluids.

It occurred to me that a solvent dispenser might be devised which could be conveniently kept on the dressing tray ready for use. After considerable experimentation with trial designs and various solvents, I would like to present the model illustrated. This consists of a stainless-steel container of convenient 3-ounce size and shape which is provided with a smooth spout containing a sensitive needle valve. It will deliver a thin solvent in just the right amount to separate adhesive from the skin, yet will not spill excess fluid into the eye nor down the face. It is equally effective in removing ordinary adhesive or the new cellophane Scotch tape.

The valve may be adjusted for different rates of flow and different solvents by turning the valve screw, and may be completely closed for carrying. The rate of flow of the solvent is faster when the dispenser warms from the hand and can be varied at will. Squeezing the sides of the dispenser, as one would an oil can, also increases the flow momentarily.

As to solvents, I have used benzene, acetone, ether, and carbon tetrachloride. Ether is undoubtedly the least efficient and is a torture to anyone who has recently had an ether anesthetic. Benzene is inflammable, burns the skin, and has an offensive odor. Acetone is better but is a powerful solvent and ruins duco or paint finishes, and is for this reason undesirable. Carbon tetrachloride is neither irritating nor inflammable and is our choice of solvents. Its odor may be disguised by the addition of one drop of oil of rose to the ounce. Carbon tetrachloride, which resembles ether, is not harmful in the amounts necessary to remove dressings. The commercial solution is quite inexpensive.

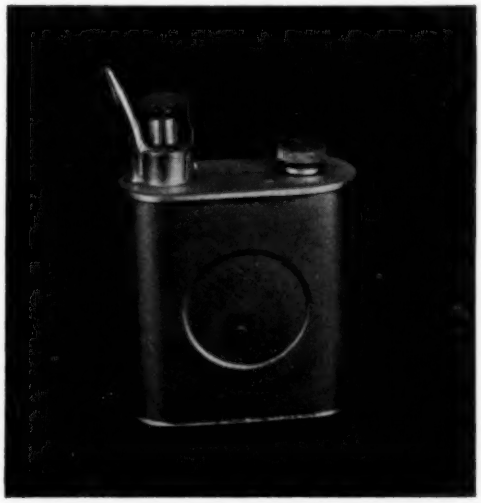

Fig. 1 (Horner). Solvent dispenser.

The solvent dispenser may be obtained from the Trainer and Parsons Optical Company, 228 Post Street, San Francisco, which has given me valuable technical aid in the development of the necessary experimental models.

490 Post Street.

PRISM SCALE FOR USE AT 50 CENTIMETERS*†**

CONRAD BERENS, M.D.
New York

Description of prism scale. This prism scale was constructed because of the desire to develop an indestructible scale the markings of which were clearly visible and which could be used to measure the strength of strong prisms. It also seemed desirable to overcome the important disadvantage of most scales in that the distance they are constructed for is beyond the focus of many lenses to be tested. Results are often inaccurate with other scales because no simple method for fixing the distance at which the scale should be used has been provided.

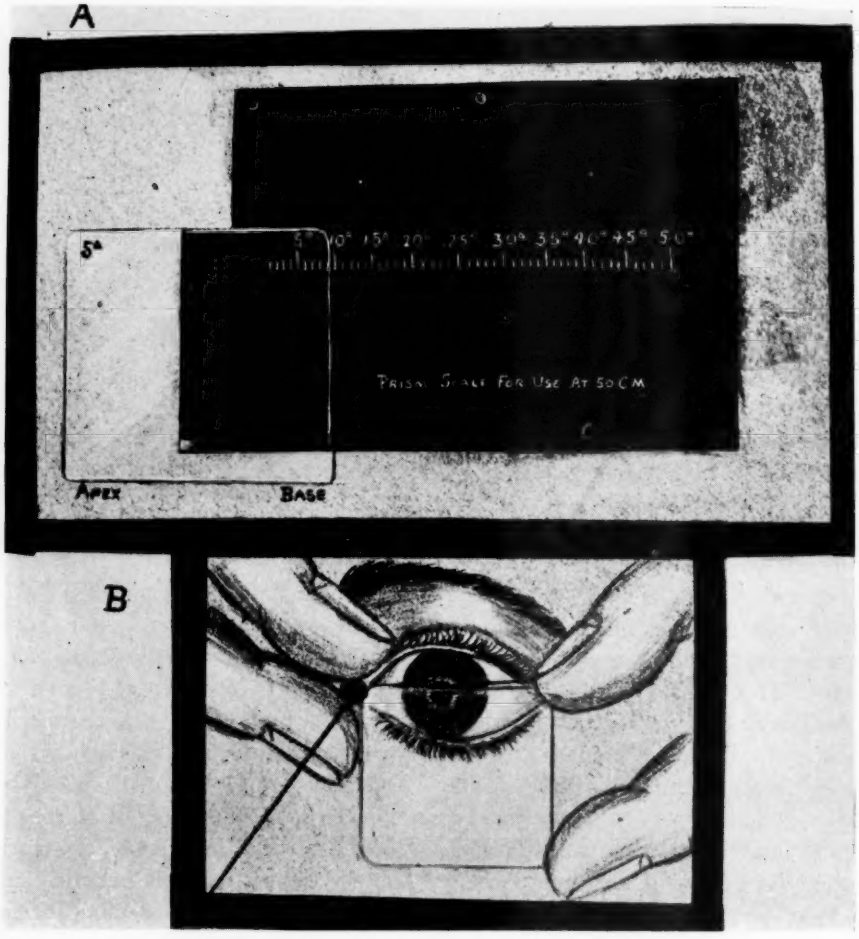

Fig. 1 (Berens). A, a prism scale for use at 50 centimeters. B, method of using the scale.

The prism scale (fig. 1A) is constructed of black bakelite, the actual scale and figures are of baked white enamel. A red-

* Presented before the American Ophthalmological Society, San Francisco, California, June 9, 10, 11, 1938.

† Made by David W. Mann, Lincoln, Massachusetts.

** Aided by a grant from the Ophthalmological Foundation, Inc.

enamel horizontal line serves as an indicator. A small metal cylinder is attached to the end of the distance cord, which may be wound around two pegs on the scale when not in use.

Method of using the prism scale. The scale should be well illuminated and placed 50 cm. from the observer, with the surface so arranged that the visual line is perpendicular to the scale. The metal cylinder at the end of the cord is placed against the prism or prismatic lens to be studied, which is held before the eye as depicted (fig. 1B). The displacement of the vertical line is read in prism diopters on the scale above the horizontal red line.

Advantages of prism scale. The advantages of this prism scale are that: (1) it may be used to test prisms of from .5 to 50$^{\Delta}$, (2) it is especially useful because many lenses have a focal distance shorter than 1 meter, (3) the 50 cm. cord facilitates the accurate measurement of the prismatic deviation and, (4) bakelite is comparatively indestructible, light in weight, and easily cleaned.

35 East Seventieth Street.

IRIDOCAPSULOTOMY SCISSORS*†**

CONRAD BERENS, M.D.
New York

These iridocapsulotomy scissors, a modification of the scissors previously described,[1] have been found satisfactory for cutting secondary membranes and in performing iridocapsulotomy.

Description. The thin, narrow blades of the scissors are 14 mm. in length, and slightly curved. They are similar in shape to the Noyes scissors, except that both blades are pointed, and the spring cutting action is different than the scissors action of the Noyes instrument (fig. 1). The stationary blade is extended by an octagonal handle 14 cm. long; the second blade of the instrument is moved by downward pressure on a broad, flat arm, 48 mm. in length, which is slightly grooved at the end, so that the index finger will not slip while using the scissors. A strong spring is attached beneath this arm, and is carried across to the stationary handle, close to the blade joints. At this end, the spring has a small rectangular cut, enabling the shaft to slide over a small wedge when activating the arm. In the iridocapsulotomy scissors, which were presented in 1926, the movable arm is joined by an additional arm which penetrates through the center of the stationary handle. Both instruments have the duckbill action and are always closed unless pressure is exerted on the arm, thereby making it easy to introduce and manipulate the scissors in the anterior chamber without muscular tension.

Method of using iridocapsulotomy scissors. After making a subconjunctival incision into the anterior chamber and perforating the membrane or capsule and

* Presented before the American Ophthalmological Society, San Francisco, California, June 9-11, 1938.

† Made by the V. Mueller Co., Chicago, Illinois.

** Aided by a grant from the Ophthalmological Foundation, Inc.

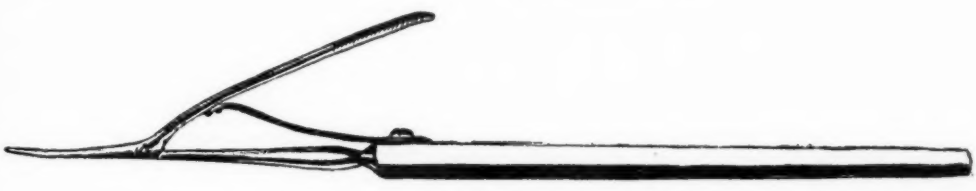

Fig. 1 (Berens). Iridocapsulotomy scissors.

iris with a narrow hollow ground keratome,[2] the iridocapsulotomy scissors, with the blades closed, is entered into the anterior chamber. The blades are opened slightly upon reaching the opening made by the keratome in the membrane, one blade is passed under the membrane, the other remains on the surface of the membrane, and the blades are then permitted to close.

Advantages. (1) The iridocapsulotomy scissors can be used through a smaller opening than can the de Wecker scissors, (2) the blades of the scissors completely fill the opening in the sclera made by the narrow keratome, thus preventing unnecessary loss of vitreous, (3) the scissors are more easily manipulated than the de Wecker scissors or the iridocapsulotomy scissors previously described.

35 East Seventieth Street.

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[2] ———. A new keratome. A hollow-ground narrow angular keratome for paracentesis, iridocapsulotomy, and iridotomy. Trans. Amer. Acad. Ophth. and Otolaryng., 1937, p. 485.

SUTURE MATERIAL FOR OCULAR OPERATIONS*

DANIEL B. KIRBY, M.D.
New York

The author has devised new sutures for use in intraocular surgery, particularly in cases of cataract for conjunctival apposition. They have been used also for plastic cases. Another needle is being designed for sclerocorneal sutures. They are made by Davis & Geck Company, and are known as Product No. P 256 Special Eye Sutures. This product comprises a group of three individual sutures, each wound on its own reel, three reels being contained in one tube. Each suture consists of black braided silk, size Six-0, length 18 inches, affixed to a specially designed one-quarter-circle cutting point atraumatic needle. The author has been pleased with the sutures. The needles are small, slender, sharp, have cutting edges, and do not turn in the needle holder. The suture material is single armed, thin but sufficiently strong. It is easily handled and tied and removed. The sutures can be supplied in double-armed needles. The product is economical, supplying as it does three sutures for use in the individual case, but being of sufficient length to be drawn through, cut off after being tied, and used again in other cases after resterilization. The sutures are 18 inches long, sufficient for three or four cases.

780 Park Avenue.

* Described before the American Ophthalmological Society, at San Francisco, California, June 9-11, 1938.

SOCIETY PROCEEDINGS

Edited by Dr. H. Rommel Hildreth

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

March 15, 1938

Dr. Edwin B. Goodall, *presiding*

Recent advances in chemistry as related to ophthalmology

Dr. Karl Meyer of Columbia University said, after a general introduction about the role of chemistry in ophthalmic research, that he was dealing with two main problems, the metabolism of the lens and cataract, and the fluid exchange of the eye. A review was given of galactose cataract and dinitrophenol cataract. The hypothesis was put forward that the lens *in vivo* might be an obligatory anoxybiotic tissue, in which oxygen and oxidation cause denaturation of the proteins composing the lens.

The recent literature on fluid exchange of the eye was discussed. The evidence for the secretory origin of the ocular fluids was presented. The isolation and composition of a high molecular polysaccharide acid in vitreous and aqueous humor was stressed as being incompatible with the dialysis theory. Data on quantitative determinations of hexosamine in the aqueous humor of rabbits and cats were given. A report was made of the influence of eserine, which definitely increased the hexosamine and protein concentration of the aqueous; of atropine, which gave varying results; and of dionin, which had no effect. A few analyses were given of the hexosamine content of glaucomatous and nonglaucomatous human aqueous punctates. In the cases investigated, including one of acute glaucoma, no increase in hexosamine or protein content was found. This finding seems to oppose the vascular origin or the histamine theory of the increased tension.

Some physiological and anatomical aspects of the cornea affecting its pathology

Dr. Theodore L. Terry read a paper on this subject which was published in this Journal (February, 1939).

Virgil G. Casten,
Recorder.

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

April 12, 1938

Dr. Edwin B. Goodall, *presiding*

Aniseikonia reviewed to date

Dr. Walter B. Lancaster read an interesting paper on the above subject. The following is an outline of the paper:

Causes: Anisometropia, asymmetrical convergence, unknown causes.

Consequences: (1) Effect on perspective, space perception, orientation (tilting plane). (2) Symptoms—namely, those of eyestrain—are like eyestrain from other causes.

Objections: (1) Any benefit from iseikonic lenses is due to suggestions, psychotherapy. (2) Anisophoria is the probable explanation. (3) Since asymmetrical convergence produces large differences in size of the retinal images without discomfort, probably other forms of aniseikonia are taken care of without symptoms.

Reply: (1) Many, perhaps most, cases of eyestrain have a neurotic factor. Aniseikonia is no exception. That is not the

whole story, however. (2) Anisophoria is a phoria which varies in different directions of gaze like a paresis. A method of testing without changing the direction of gaze still shows the aniseikonia. Also the tilting plane cannot be accounted for by anisophoria though easily explained by aniseikonia. (3) It is easy to show on the Ames haploscope that asymmetrical convergence is automatically compensated because the optical image of the adducting eye is made larger by just the amount needed to correct the inequality of the retinal images which would naturally follow from asymmetrical convergence. It is a striking example of compensation. There are other ways of compensation that we do not know so much about. We know that some of them, when overtaxed, produce eyestrain that is relieved by eikonic lenses. Much harm has been done to the subject by overenthusiastic claims.

The steady progress that is being made by The Dartmouth Eye Institute in solving the many problems that arise from investigating the phenomena of binocular vision is convincing reason for confidence in their work.

Some aspects of visual organization

Dr. Kurt Koffka from the Department of Psychology, Smith College, Northampton, Massachusetts, read an interesting paper on the above subject. Dr. Koffka's problem was the connection between retinal stimulation and the central processes that correspond to vision. His thesis was that this connection is not a point-to-point coördination but that the total stimulus pattern supplies the boundary conditions for the organization of the central processes.

Dr. Koffka illustrated his thesis by a number of examples. He began with the pseudofovea of hemianopics, relying on experiments by W. Fuchs (carried out in the Frankfurt Institute of Gelb and Goldstein), which he has briefly discussed in his "Principles of Gestalt psychology" (Harcourt, Brace, 1935, on pp. 202ff.). He discussed the Aubert-Foerster phenomenon (see, for example, Ellis Freeman: What does a test of visual acuity measure? Arch. of Ophth., 1929, v. 2, July, pp. 48-56), and added an experiment by Gelb discussed in his "Principles" on page 205, and one or two others. He then introduced the distinction of homogeneous and inhomogeneous stimulation and described in accordance with Metzger's experiments (see his "Principles," pp. 126ff.), that not all inhomogeneities are equally effective and turn to the laws of organization. Finally, he applied the same point of view to problems of eye movements (accommodation and fusion; see his "Principles," pp. 311 and 314ff.), and he ended with the problem why the objects appear at rest while we move our eyes.

Virgil G. Casten,
Recorder.

SAINT LOUIS OPHTHALMIC SOCIETY

April 22, 1938

Dr. Roy E. Mason, *president*

Management of glaucoma following cataract operation

Dr. B. Y. Alvis read a paper on this subject which is published in this issue of the Journal.

Discussion. Dr. William H. Luedde said because it is the problems of postoperative glaucoma which are under discussion, it appears reasonable to base conclusions on what can be demonstrated by examination of the ocular tissues. However, the percentages quoted concerning the incidence of this complication

(1 percent by Collins, 0.64 percent by Knapp, 2 percent by DeGama Pinto) may remind us of the 2 percent of malignant glaucoma reported by Von Graefe. These were also cases of postoperative glaucoma. They were in patients in whom the state of "absolute glaucoma" supervened after iridectomy for the relief of a previously existing glaucoma. The reaction to iridectomy in this special group resembles that reported by Kirwan after simple iridectomy for glaucoma in the eyes of patients suffering from epidemic dropsy. These were invariably made worse. These experiences seriously raise the question of the relation of the colloids of the blood plasma to the local ocular disease; a question not yet answered, but challenging further study. Kirwan found that filtering scars as provided by the trephine operation were successful in reducing intraocular hypertension in his cases. In two of his own patients the usual cataract extraction was complicated during the healing process by a slight iris entanglement at the extreme angle of the corneal wound with the formation of a filtration bleb under the conjunctiva. When he learned later that the brother of one of these patients had a cataract extraction followed by glaucoma and the sister of the other patient had become blind from glaucoma following cataract operation, he was not so sorry about whatever postoperative accident caused the iris prolapse, because both of the patients have retained vision of 20/20 or better for many years. This occurrence brings up the consideration of the statement by Dr. Alvis that a perfect operation for cataract does not seem to confer immunity from postoperative glaucoma, nor does it necessarily follow a less brilliant surgical technique.

Sometimes the cause of the secondary glaucoma is obvious, as it was in a young girl in whom absorption after discission of a soft cataract was so perfect that excellent vision (20/20+ with correction) was achieved, but in one quadrant the iris had been doubled back upon itself by the first swelling of masses of lens substance in the anterior chamber. Gradually, a quiet increase in intraocular pressure began in this eye. The patient, with a curious mental twist, refused any further surgical correction and that eye became totally blind with glaucomatous atrophy. Surgical measures involving the iris usually can open only a small segment of the circumference of the iridocorneal angle, hence the postoperative use of miotics appears just as reasonable as for preoperative care in glaucoma. He has never sympathized with tests made to see if the patient could get along without any treatment after operation when instillations of a miotic at bedtime or twice daily might promote the safety and well being of the eye. For reasons noted in his recent résumé before this society, he always uses a strong miotic immediately after stronger solutions of epinephrin and has had no reason to regret it.

Inclusion operations appear to defy fundamental surgical principles in spite of their recorded success. Cyclodialysis, which offers no external or episcleral drainage, has never made a strong appeal to him. Since Ridley has demonstrated experimentally that the corneal limbus may be a factor in transfusion of fluids, he has secured striking general conjunctival edema when excision of corneal tissue was combined with iridectomy. Similar results were reported by Conrad Berens and the success of Otto Barkan's gonioscopic trabeculotomy may be explained in that way. Does Dr. Alvis use the bubble of air to raise up a cornea that collapses after cataract extraction? He has steadily avoided additional instrumentation in such cases and has failed to see any results that might indicate a greater

liability to postoperative glaucoma in such cases.

If, as was suggested, a low-grade infection and congestion can be caused by a tag of vitreous caught in the wound, then, also, the same reaction might be caused by extraocular foci of infection which apparently can produce these phenomena in eyes that have not been traumatized—surgically or otherwise. Thus, it would appear that every precaution, such as the preoperative elimination of focal infections, and so forth, may be properly applied to this class of cases as well as in any undertaking of intraocular ophthalmic surgery. This has been well demonstrated by Dr. Alvis's excellent résumé of his experience in postoperative glaucoma.

Discussion. Dr. B. Y. Alvis stated that he had used a bubble of air in raising a collapsed cornea and it may or may not have been advantageous. It made him feel better to close the lids with the wound margins already coapted.

Removal of intraocular foreign body after 18 years

Dr. F. E. Woodruff reported that 18 years ago, on October 8, 1919, Roland M., aged eight years, presented himself with the following history: About four months previously he had been shot in the right eye with bird shot. There was no history of pain nor inflammation after the injury. The lens was completely opaque. A small scar in the cornea, and the iris wound, showed the path of the foreign body. Light perception and projection were good. No examination of the fundus was possible because of the opaque lens.

X-ray examination and localization showed a small foreign body in the globe, 2 mm. below the horizontal plane of the cornea, 11 mm. to the temporal side of the vertical plane of the cornea, and 15 mm. behind the center of the cornea. The father was advised to bring the boy in from time to time to determine further action and treatment.

The patient did not return until March 31, 1931, reporting that he had not been under care or treatment since the injury in 1919. At this time (that is, 1931) the eye was deviating outward, light perception was good and projection only fair. The fellow eye was absolutely normal. Some of the lens substance had been absorbed and there was a fairly dense membrane with some iris adhesions. A needling was performed on April 2, 1931. The remaining lens substance absorbed but a second needling of the capsule was necessary. The membrane retracted back of the iris.

In 1933 the patient was reëxamined. The right eye was quiet and the left eye, measured for a +0.50 D. cyl. ax. 90°, obtained normal vision. There were no symptoms whatsoever.

On September 15, 1934, the patient reported some difficulty with the right eye but this proved to be only a slight conjunctivitis which subsided under local treatment.

On September 21, 1937, the patient again presented himself with the history that for the last two years he had had intermittent trouble with his left eye, which was his good eye. There was some squinting, some disturbance of vision on the street and in picture shows. The eye was tender on pressure. He came for examination at this time not because of trouble in the eye but because of his wife's insistence (a doctor's daughter). The good eye was slightly irritable and tender but no impairment of vision could be demonstrated. X-ray examination of the right eye revealed a foreign body 11 mm. below the horizontal plane of the cornea, 3.5 mm. to the temporal side, 11 mm. behind the center of the cornea. On September 28, 1937, a scleral incision

was made at the site as localized. One lip of the wound was depressed and the shot fell into the spoon. The patient made an uneventful recovery.

This case is reported because of the length of time, 18 years, that the shot was in the eye before giving rise to symptoms referable to the foreign body. Since the foreign body was lead shot he thought that one could afford to wait at least for a time. The position of the shot in 1919 was such that it would have been a miracle if one had succeeded in getting it from its location at that time.

The gravitating of the shot into the neighborhood of the ciliary body was probably the cause of the disturbance of vision and slight tenderness experienced at the time the patient last presented himself. This may have been a sympathetic irritation which might have led to a sympathetic inflammation and loss of the good eye. Fear of this was the reason for interference.

Discussion. Dr. William F. Hardy said that Dr. Woodruff is to be congratulated on his ability to remove a nonmagnetizable foreign body from the vitreous without the use of forceps and consequent manipulation and disturbance of the vitreous. This fortuitous circumstance was occasioned by the change in the position of the foreign body from its original position to that 18 years later which brought it in close apposition to the sclera.

The history of foreign bodies in the vitreous is a rather sorry one. The seriousness varies, depending on a number of factors: (1) the size and shape of the penetrating substance, (2) its chemical nature, (3) the velocity with which it strikes the eye, (4) the site of penetration, (5) the presence or absence of infection, (6) the secondary changes which ensue.

A small object of inert chemical nature hitting with moderate velocity, producing a clean-cut portal of entry, penetrating the sclera behind the ciliary body, and sterile in nature, should produce the least serious type of intraocular foreign body. Few fill all these requirements and the danger to the eye varies with each deviation therefrom.

Because of their size and shape some foreign bodies immediately and completely demoralize the ocular tissues. Others by their chemical nature produce so much reaction that the eye must eventually be destroyed. Lead, glass, wood, and stone are more or less inert. Copper, particularly, and iron are chemically active and destructive; both undergo chemical changes with deposition of their salts and staining of the tissues. Copper may lie dormant for a while and then may at any time start activity. A piece of copper within the eye is a veritable sword of Damocles hanging over the head of the unfortunate host. In favorable cases encapsulation of the foreign body may take place, which, in a sense, is a protective measure, but on the other hand makes removal more difficult and retinal detachment more likely.

Other factors being equal, a body of low velocity should produce less trauma than one of high velocity. The latter is likely to produce a double perforation, the outlook of which is very grave. Penetrations through the cornea usually mean traumatism to the lens. Objects lodging in the lens offer a good visual prospect, as the resulting cataract and foreign body may be successfully removed at one sitting. The presence or absence of primary infection is of the greatest importance. Fortunately, small particles of metal are usually sterile, due to the heat generated by the impact which gives rise to them. Many eyes are marked for destruction within 48 hours, due to the violent infection carried by the penetrating body.

One point which is always the subject of debate is the method of extraction of a magnetizable object: whether by the anterior or posterior route; whether through the original penetration or through a surgical one. This can apply usually only to foreign bodies in the vitreous chamber. In some cases a foreign body in the anterior segment can be removed with less trauma and manipulation through a surgical wound. As the foreign body in this case report was inert, any further discussion of these points is unnecessary.

The points of greatest interest in Dr. Woodruff's case are the following: (1) the length of time the foreign body lay dormant. This was due to its inert chemical nature; (2) the change in position making removal feasible; (3) the accurate localization; (4) the accuracy of the incision for removal; (5) that it was not encapsulated nor held by adhesions, and that it was in juxtaposition to the sclera, allowing it literally to drop into the operator's hand.

As to the presence of sympathetic irritation, he is a little skeptical unless the essayist has further data which he did not bring forth in the case report.

Dr. Roy Mason mentioned that there were a few cases in which he had removed nonmagnetic intraocular foreign bodies successfully, though the operation failed as far as sight was concerned. He had been successful in two vitreous cases, though there was a complete detachment of the retina following the operation. We are seeing more cases of nonmagnetic foreign bodies; new metals are being used, alloyed metals which are nonmagnetic. He believes our specialty has been neglectful in not giving a little more study to the removal of nonmagnetic foreign bodies.

Bilateral glioma

Dr. M. L. Greene presented a case of bilateral glioma in a baby four months of age. One eye was in the glaucomatous stage, the other eye was preglaucomatous. There was no evidence of calcium deposits in the X-ray pictures of either eye. X-ray treatment of 400 R. was given to the right eye, which was then enucleated. There was no evidence of any cell destruction as a result of the X-ray treatment; in fact, an unusual number of mitotic figures were present. The left eye received a total of 1,200 R. and is still under observation, the tumor being very much smaller than when first seen. Two other cases of unilateral glioma were presented and discussed. There were no unusual features to these cases and they presented no calcium deposits on X-ray examination.

Discussion. Dr. Jule T. Elz said the eye enucleated in this case was placed in bromo-formol in order that some of the newer impregnating methods might be used, which he believes are necessary for a proper study of such tumors. Most of the knowledge of the histopathology concerning this group of neoplasms has been acquired as a result of the use of these staining methods and they should be used more frequently in order that the cell types present may be more thoroughly studied.

The term glioma retinae is a good one, especially if used in a generic sense and is preferred by Ewing. Dr. Elz favors the splitting of the main group of gliomas into three subgroups, depending on the predominating type of cell present; namely, the medullo-epithelioma, the retinoblastoma, and the neuro-epithelioma. He does not agree with those authors who seem to imply that all these tumors should be called retinoblastomas.

On opening the eye under discussion the vitreous cavity was almost entirely filled with a white, granular, friable mass. Sections of this tumor showed it to be a typical glioma of the neuro-epithelioma subgroup. The great number

of mitotic figures present was striking.

This case is of particular interest because the remaining eye is also involved and is receiving X-ray treatment. Reports in the literature indicate that this method of treatment has met with some success even though the glioma is considered radioresistant. In an article published in the November, 1936, issue of the Archives of Ophthalmology, Martin and Reese describe an X-ray therapy technique which seems to be a distinct advance in the handling of cases such as this one.

H. Rommel Hildreth,
Editor.

CHICAGO OPHTHALMOLOGICAL SOCIETY

April 18, 1938

DR. THOMAS D. ALLEN, *president*

RELATION OF GLUTATHIONE TO GALACTOSE CATARACT

DR. JOHN BELLOWS and DR. L. ROSNER (by invitation) said that in a series of experiments galactose caused a decrease in the permeability of the capsules of beef lenses toward glutathione. Studies upon variation of lens glutathione with age were made. It was determined that lens glutathione of rats at birth is at the low value of about 50 mg. per 100 gm., it rises rapidly during the first days of life, reaches a peak of about 300 mg. per 100 gm., at an age of four months, then slowly declines. The glutathione concentration in the lens nucleus remains at a fairly constant low level, while that in the cortex fluctuates significantly with age. Feeding rats a diet high in galactose causes a loss of lens glutathione. However, when the animal is returned to a normal diet, the glutathione returns, showing ability of the lens to recover from incipient cataract. Even after development of cataract the lens retains the ability to form normal transparent lens fibers in its periphery. Glutathione, however, cannot return to the opaque portion of the lens.

Discussion. Dr. L. Rosner (closing) said that upon feeding galactose the glutathione content in the lens decreased, and when the rats were returned to a normal diet the glutathione once more rose, indicating that the ability of the lens to produce this substance was retained.

He pointed out that it was difficult to study the capsule in life from the viewpoint of permeability. Two membranes are concerned, that of the capsule and the membrane of the lens fibers themselves. Thus a study in life of the lens capsule is complicated by the permeability of the lens fibers. If it were determined that a certain substance could not penetrate into the lens, would it be attributable to lack of permeability of the lens capsule or to impermeability of the membrane of the lens fibers? The experiments wherein the capsule was removed entirely, while open to the objection that they were not so significant as *in vivo* experiments, did get around the objection of possibly working with two different permeabilities.

In reply to Dr. Goldenburg's question, Dr. Rosner stated that there is no glutathione in the aqueous; it is contained entirely in the lens. The membranes of the body seem to have a selectivity to glutathione. In the blood, for example, it is in the red cells entirely; there is none in the plasma. It appears to be contained entirely in the cells of the body, not in the fluids. For that reason he believes that glutathione is probably manufactured in the lens itself and is not a matter of penetration into the lens.

CONGENITAL ABDUCENS PARALYSIS

DR. CARL APPLE read a paper on this subject which was published in this Journal (Feb., 1939).

Discussion. Dr. Sanford Gifford

thought that Dr. Apple had presented a very fine paper on this subject, to which too little attention was sometimes paid. It must be remembered, however, that there are a good many cases of congenital abducens paralysis in which the retraction syndrome is not a prominent feature. Some retraction might be found in all by careful study, but many cases had been seen in which it was not noticeable.

Tendon transplant had been successful in his hands. In cases without retraction, if strabismus was present, a good result could be obtained by transplant with tenotomy of the internal rectus. He had operated in nine cases. Two were acquired due to intracranial injury and the others were congenital, without a typical retraction syndrome. The outer half of the superior and inferior rectus was transplanted under the insertion of the external rectus, accompanied by tenotomy of the internal rectus. Possibly there were some bands in these cases, but that had not been investigated. In one case an overcorrection was obtained, resulting in slight abduction. Only cases in which there was a primary convergence were brought to operation. The abduction which resulted from operation varied from 5 degrees to as much as 35 degrees. The only way such a result could be explained was not by the reëducation of the muscles but by the tone which these living-muscle slips gave to abduction. They held the eye in a certain position opposed by the internal rectus. When the internal rectus was relaxed in the attempt to abduct, they came into effect and actually caused the eye to rotate outward.

Cases of congenital abducens paralysis have been reported in which autopsy disclosed complete aplasia of the sixth-nerve nucleus; so it must be assumed that in such cases there is a central origin for the paralysis.

Dr. E. V. L. Brown asked if it would be helpful to observe whether passive motion outward was possible under general anesthesia.

Dr. S. J. Meyer agreed with Dr. Gifford that operative interference is indicated and should at least be given a fair trial. He had operated on 18 patients with a good result in more than 50 percent. Some of the poor results occurred in cases in which there was marked secondary contraction of the internus muscle; so marked, in fact, that there was difficulty in performing a complete tenotomy of the muscle. He did not believe it made much difference whether lateral or medial halves of the superior and inferior recti muscles were transplanted. The external rectus muscle could be let alone if it were thought advisable. One must be meticulous in the dissection of the vertical muscles to be transplanted so that the sutures would not tear out.

Dr. Hallard Beard thought it always seemed fallacious to expect a portion of the adductor muscle to do the work of the abductor, such as one expected of the split portion of the superior and inferior rectus. One might hope to accomplish a good cosmetic position for the eyeball by such procedure, but hardly any restoration of function; and if one depended on the slight rotation of the eyeball by transplant of the tendon, then it would be better to sever the tendon of the externus if it were found to be a fibrous band. It would not be out of order either to slip back the insertion or sever the connection entirely from the eyeball so that it would not become reattached.

Dr. Carl Apple (closing) thought that Dr. Brown's suggestion was excellent. In 1926 Dr. Harold Gifford had stated that passive abduction should be tried in all cases. Passive abduction was attempted in the three cases reported, both prior to the operation and after tenotomy of the internus.

MONOCULAR PROTECTION VERSUS MONOCULAR OCCLUSION

DR. W. W. HOWARD read a paper on this subject which was published in this Journal (Feb., 1939).

Robert von der Heydt.

COLLEGE OF PHYSICIANS OF PHILADELPHIA

SECTION ON OPHTHALMOLOGY

April 21, 1938

DR. ALEXANDER G. FEWELL, *chairman*

MUSCLE SPASM CAUSED BY EYEGLASSES

DR. LEO F. MCANDREWS presented the case of a man 41 years of age showing this interesting finding: as soon as the patient attempts to wear his glasses, a distinct, hard mass appears over the region of each mastoid. Under palpation this mass is evidently a contraction of the occipito-frontalis muscle. If the patient persists in wearing the glasses, the entire right side of the head and the right ear become painful and the neck becomes stiff. Removal of the glasses or firm pressure on the bridge of the nose causes the mass and discomfort to disappear. The condition has been present for about four years. The patient had a thyroidectomy three months ago, but he is still very nervous and emotionally unstable. There is no anatomic explanation for this condition. The probable explanation is that it is a neurotic manifestation associated with the toxic thyroid, and can be cured by appropriate psychotherapy.

Discussion. Dr. Walter I. Lillie said it was his impression that this is a spastic condition. Its duration of four years makes it very suggestive of a postencephalitic syndrome. When the man puts his glasses on he has a marked twitching of the eyelids. In a postencephalitic syndrome, especially those including respiratory changes, any sudden touch to any part of the body eliminates the attack. It would be interesting to follow this case and see if he develops a Parkinsonian syndrome.

OCULAR-MUSCLE PALSIES IN A CASE OF TOXIC GOITER

DR. C. E. G. SHANNON made a supplementary report on a case of ocular-muscle palsies complicating toxic goiter. A preliminary report of this case was made at the meeting of the Section in April, 1937.

The patient, H. D., a milk driver, aged 47 years, was admitted to the Jefferson Hospital on April 2, 1936, with a diagnosis of exophthalmic goiter. His chief complaints were tremor of both hands, palpitation of the heart, bulging of both eyes, diplopia, excessive perspiration, and loss of weight. The blood count as also the Wassermann and Kahn reactions were negative. The basal metabolic rate was plus 45. Motility of the larynx was normal, with no apparent narrowing of the tracheal airway.

A subtotal thyroidectomy was performed, and the patient was discharged 10 days after the operation in good condition and relieved of all toxic thyroid symptoms aside from the proptosis and diplopia.

Briefly, the ocular history of the patient is as follows: In March, 1938, about a month prior to the removal of the thyroid gland, the patient first developed ocular symptoms consisting of diplopia, followed shortly by swollen and edematous lids and later by bulging of both eyeballs. The diplopia and proptosis persisted, but the lids became more quiet immediately following the operation. At the first examination of the patient, on December 4, 1936, the following notes were made: Vision, right eye 6/9 plus; left eye 6/9 mostly. Pupils were equal and reacted freely to light and consensually. The ten-

sion was normal in each eye; the media and fundi were negative. Both eyes were proptosed, the exophthalmometer showing 23 mm. on each side. The left eye appeared definitely deviated inwards and on a lower plane than that of its fellow. The Maddox rod showed an esophoria of 30 degrees and left hypophoria of 26 degrees. Diplopia was obtained in all the cardinal directions except in the immediate lower field—that is, about 12 to 14 inches from the eyes—indicating involvement of all the extrinsic muscles of the eyeballs. It was interesting to note that a wide separation of images at 20 feet diminished steadily as the light was brought toward the eyes until at a comparatively near point the diplopia nearly disappeared, suggesting a paresis of divergence. The power of accommodation was affected. The patient read J.14 at four inches on the right side and at five inches on the left side.

Various theories have been advanced in connection with the development of the exophthalmos, but so far none has proved entirely satisfactory. The etiology of muscle palsies in toxic goiter is still under discussion. The essayist made reference to the various theories so far presented by various authorities. In the preliminary report, an immediate operation to correct the muscular deviation was considered. In the discussion that followed, Dr. Zentmayer had suggested very wisely that an operative procedure should be delayed until the congestion and the proptosis had further subsided. He cited the report by Naffziger of cases of malignant exophthalmos with blindness in which enucleation was followed by death.

Two months later, under ether anesthesia, the superior rectus was tucked and the inferior rectus recessed. In addition, the external rectus was tucked and the internal rectus recessed. There was considerable reaction, as might be expected, to these procedures but under ice compresses the swelling diminished, and binocular single vision was exhibited and still obtains.

A CATARACT SECTION REDUCING THE INCIDENCE OF IRIS PROLAPSE

DR. FRANK C. PARKER said the cataract operation today is frequently being made more and more complicated by conjunctival flaps and sutures. Instead of striving for simplicity and a short operative time, the opposite seems to be in vogue. In his own work he has found no reason whatever to make use of these embellishments.

Frequency of prolapsed iris in the simple extraction occurring up and in at about the 11-o'clock position in the right eye and at the 1-o'clock position in the left eye, raised the question as to the cause. The answer seemed to be that the drag of the knife as it is pushed through and pulled back with the upward push required to make the cut, is partly responsible. The structures—cornea and iris—are stretched peripherally, thereby weakening the iris fibers with resulting prolapse.

The incidence of prolapse has been greatly lessened by making the incision in a reverse manner to the customary section. As the knife is making the counterpuncture the heel is raised and the cut is made by pushing towards the pupillary center; and, as the knife is withdrawn, the point-end is raised, cutting as the blade is pulled back. In this way the force of the cutting results in a compression of the cornea and iris instead of peripheral stretching.

The manner of fixation is important in reducing the corneal stretching. The fixation forceps grasp the conjunctiva with a deep bite about 5 mm. above the upper limbus. The tissues between the cutting edge of the knife and the forceps above

the upper limbus are compressed, whereas when fixation is made below the whole cornea is stretched in the vertical meridian. If the cornea is stretched, it is reasonable to assume that the iris base is stretched as well. Large, bloody conjunctival flaps are not favored, simply a small fringe of conjunctiva on the lip of the wound is desired.

Discussion. Dr. H. Maxwell Langdon said he wondered if Dr. Parker has considered a bridle suture under the superior rectus. It seemed to him that it would not be quite so much in the way as forceps in this position, and it would give him very good counter pressure against the knife. He did not see just where reversing the usual procedure in making the cut exerts less drag on the cornea. If the point or the heel is raised first, the other portion of the knife must make the next step in the precedure and it seems to him that the drag would be about the same.

Dr. Francis Heed Adler asked Dr. Parker if he had noticed any decrease in the amount of striate keratitis in his cases, using the present method of making the section. He cannot understand how this method would diminish the incidence of prolapse of the iris, but he can believe that it might materially reduce the amount of striate keratitis.

Dr. Parker in answer to Dr. Langdon's question said he had never used the bridle-suture fixation, as it requires a pull upon the globe before fixation comes into play. With an open wound, such as is present following extraction, this does not appeal to him. Again, forceps fixation does away with any "swaying" of the eyeball. Further the placing of this suture adds to the operation and consumes time.

He had not seen any striate keratitis for some time past. Whether or not this can be attributed to the lessened "drag" in this incision he was not prepared to say. However, one might easily deduct that with diminished stretching of the cornea, striate keratitis would be kept at a minimum.

The clinical significance of the retinal changes in leukemia

Dr. Glen G. Gibson said his paper was a report of the laboratory and retinal findings of 22 cases diagnosed as various kinds of leukemia by the medical department of Temple University Medical School. Based on the findings in these cases a discussion of the diagnosis and the prognosis is given. Emphasis is placed on the retinal veins being darker and fuller than normal in 17 of the 22 cases. In general, there seemed to be a relationship between the amount of retinal hemorrhages and the clinical condition of the patient. In general, the patients who had the lowest red-blood-cell count had only a moderate degree of retinal hemorrhage and those with the higher red-blood-cell count had no retinal hemorrhages. It was suggested that it might be more advantageous to direct therapeutic and investigative procedures toward the factor of anemia instead of towards the leucocytosis.

Discussion. Dr. Gibson in answer to Dr. Adler said in observing these cases one gets the impression that the white centers are due to a collection of serum and hemorrhagic debris rather than to a nest of white blood cells surrounded by red blood cells. He regretted that he had no microscopic confirmation of this impression.

External orbitotomy

Dr. Edmund B. Spaeth presented a moving-picture demonstration of the external-route orbitotomy without bone resection for the removal of retrobulbar tumor.

Warren S. Reese,
Clerk.

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DICTATORSHIPS, DEMOCRACIES, AND POSTGRADUATE MEDICAL STUDY

The Greek word "turannos" (tyrant) meant an absolute ruler, and not necessarily one who abused his power. There have been a few benevolent despots, but there are not many exceptions to the rule that when the power of an individual or of a group is uncontrolled it will sooner or later be abused; that is, it will be exercised without regard to the rights of others.

It is probable that great political power has never been entirely free from abuse. No individual or group possesses infinite wisdom and fairness. The hysterical vagaries of the ignorant mob are notorious, yet the rights and liberties of the general populace are in the long run safer under democratic than under autocratic, or "tyrannical," forms of government.

Today it appears that the greatest loss resulting from the World War is the sacrifice, in several civilized countries, of those great measures of human liberty which had been achieved step by step in the course of generations.

Exhausted by four years of murderous and ruinous struggle, and by the ensuing financial chaos, the democracies seem to have lost the spirit of resistance to usurpation and absolutism. Excesses such as disgraced the Middle Ages have been tolerated almost without a murmur by peoples who were regarded as in the van-

guard of civilization. Beneath the veneer of material progress man the brute appears in all his primeval crudity.

It is hardly surprising that a tyrant should make his own interpretation of scientific facts and values. His dogmas come first, and facts are grouped or distorted to suit those dogmas. Facts that fail to harmonize with his alleged principles must be ignored or falsified.

In the wonderful hygienic exposition of a large European city, the scientifically-minded traveler is shocked but not altogether surprised to find that the pure science of one section of the great building has been replaced by blatant, hideous, and unscrupulous exhibits whose purpose is to prove the purity and superiority of the Nordic and the degradation and inferiority of those who are denied that appellation.

Since absolute rulers do sometimes display liberality of thought, it would be wrong to argue that tyranny is always incompatible with scientific progress. But suppression of all independence of thought and action cannot fail to inhibit the scientific spirit.

Apart from more material considerations, one priceless advantage of living in a democratic community is the feeling that one may express himself according to his honest convictions and may hear or read a free expression of the opinions of others, without restraint of censorship or danger of political persecution. In some European countries, not even the traveler from another land may enjoy these privileges; and the visiting tourist suffers from an uneasy sense of restraint and concealment. No amount of hospitality displayed by those among whom he travels can overcome these barriers. Newspapers report only what they are allowed to report. Newspapers and citizens alike believe (to outward appearance) only what they are allowed to believe. After such an experience, to cross the boundary into a country that is still democratic is to escape from a mental and spiritual prison.

In spite of the rapid development in facilities for postgraduate education in the United States and Canada, many medical pilgrims from this country still visit the old clinical institutions of central Europe. But under present conditions it may be doubted whether such cities as Vienna will maintain their former prestige as centers for postgraduate study in the various fields of medicine.

We are told that in the stress of preparation for another great war, one of the dictator countries has recently curtailed the undergraduate period of medical study, as well as cutting one year from the length of the "gymnasium" or preprofessional course. A certain significance may also be attached to changes in the field of medical journalism, due perhaps partly to political and partly to economic causes.

The combination of Graefe's Archiv für Ophthalmologie with Archiv für Augenheilkunde, both journals of very limited circulation, may probably be dismissed as a mere matter of economy. Removals of journals from one country to another are more likely political in character. What was formerly the Zeitschrift für Augenheilkunde, an excellent monthly founded forty years ago by Kuhnt and Michel, is now published as "Ophthalmologica" at the Swiss city of Basel. It prints essays in English, French, and German, and its list of editors contains prominent names from various civilized countries, not including Germany.

Another medical periodical, Ars Medici, has moved its place of publication to Basel from Vienna. In that great Austrian capital it served for sixteen years as a sort of publicity agent for postgraduate medical teaching facilities. It is a modest monthly, "the only medical journal in the English language appearing on the Continent,"

and presenting usually one original article and a large number of well-written abstracts from miscellaneous medical journals. It had formerly an official connection with the "American Medical Association of Vienna," an organization having no connection with the American Medical Association, but serving as a center for contact and information among English-speaking physicians who were attending the Viennese schools, hospitals, clinics, and privately conducted classes.

This little journal announces that one of its major purposes is to furnish information to physicians seeking postgraduate work. "Five faculties of as many medical colleges of the universities Basle, Berne, Geneva, Lausanne, and Zurich . . . are now prepared to teach you if you desire to specialize or do postgraduate work in any and all branches of medicine." It is added that all courses will be in English. The name of Professor Alfred Gigon, Klosterberg 27, Basel, Switzerland, is given as chairman on the faculty committee, to whom correspondence relating to medical courses in Switzerland may be addressed.

The five Swiss universities mentioned have produced many famous names in medicine. Switzerland is the world's greatest holiday resort. It is still one of the freest countries of the world. Foreign study is usually combined with a good deal of sight-seeing and enjoyment of other recreational facilities. Think of the opportunity for such combinations afforded by Basel, south of which lies a rolling country at least as attractive as the Black Forest although less advertised; Bern, the Swiss capital, a little way north of the Bernese Oberland; Geneva, astride the west end of Lake Geneva and within easy distance of Mont Blanc; Lausanne, further along Lake Geneva; and Zurich, commercial capital of Switzerland, location of this year's Swiss national exposition, and scene of Vogt's work on the slit-lamp. If you desire to go abroad for postgraduate study, why not choose Switzerland?

W. H. Crisp.

TREATMENT OF GLAUCOMA

When ophthalmic surgeons first recognized glaucoma as a cause of terrible pain and permanent blindness, these effects seemed unavoidable. When Graefe noticed that iridectomy lowered intraocular tension, and reported some cases cured by the operation, it was at once accepted as the one cure of glaucoma. Since then, other operations—division of the ciliary body, iridotomy, trephining, iris inclusions, the Lagrange operation, cyclodialysis, Holth's punch operation, and opening of Schlemm's canal—have been brought forward as curative of the disease. These operations have all been founded, mainly, on the assumption that glaucoma was caused by mechanical obstruction to the outflow of fluid from the eyeball, and was to be relieved by opening a new channel for such mechanical outflow.

We cannot believe that the regulation of intraocular tension is purely a mechanical process. The regulation of intraocular tension must be intimately connected with the nutrition and metabolism of ocular tissues. But our knowledge of the physiology and biochemistry of nutrition for the different tissues of the eye is scanty. It must be supposed that the endothelium of the capillary blood vessels and the glass membranes of the eye—Bowman's, Descemet's, the lens capsule, and Bruch's—may play a part in these processes as well as the composition of the blood serum and the height of the blood pressure.

An approach to this side of the glaucoma question is suggested in the use of splenic extract, as described in this issue of the Journal, page 536. The facts al-

ready observed would suggest the production in the spleen of some biochemical product capable, either directly or indirectly, of influencing the intraocular pressure. What this substance is, and how it acts, we do not know. But each use of it to reduce the intraocular pressure in a case of glaucoma becomes a physiological experiment, to be observed and recorded, with associated phenomena, as capable of throwing possible light on the essential process of intraocular tension and its pathological increase.

The operations that have been done for glaucoma, and each urged as superior to the others, are so varied in their plans and execution, and are supported by such a wide range of theoretic explanation of glaucoma and its relief, that we must realize the treatment of glaucoma is quite empirical; and anything that as an empirical treatment seems to give relief must be considered worth trying. It would justify careful observation, with the presumption that it has some value. Under these circumstances, even if we doubt the theoretical explanations of such cures, we have the right and duty to make use of the new remedy in those cases where there is a doubt of the efficacy of the remedies we have previously relied on.

The miotics have been widely tried for glaucoma, and generally with benefit. Laquer, of Strasburg, for more than five years kept his own eyes from any permanent loss of vision by increased tension, before he had them operated on (iridectomy) by Horner. After that he lived a quarter of a century using his eyes, as he had done before, without any recurrence of glaucoma. In occasional cases of undoubted glaucoma, the use of miotics has brought about a return of the eye to health, with no recurrence of the disease subsequently. The common belief that glaucoma means either operation or blindness is not correct. We must admit that there is something beside operation that can cure glaucoma. To find out what this something is, is a proper subject for investigation and experiment. What we now know of the actions and power of the endocrines makes it reasonable to think that something formed in the spleen may be what is needed to reduce intraocular tension. Only experiment can decide whether this is, or is not, true.

It is not true that a certain increase of intraocular tension is safe for all eyes; or that pressure above a certain point is sure to damage a particular eye. Eyes with less than 20 mm. of mercury pressure undergo atrophy of the optic nerve, with deep, glaucomatous cupping. Other eyes with tension of over 30 mm. go on for years without any impairment of vision or of the visual field. We do not recognize brief changes of intraocular tension without evidence of damage to visual function. We need more knowledge of the physiology of ocular nutrition and of intraocular pressure to furnish a rational basis for the therapeutics of glaucoma. Meanwhile, every measure found empirically to be of some benefit should be tried. It should be studied to find its relative efficiency and indications and to enrich our armamentarium for the future.

Edward Jackson.

BOOK NOTICES

TRANSACTIONS OF THE AMERICAN OPHTHALMOLOGICAL SOCIETY. Edited by Dr. Bernard Samuels. Clothbound, 370 pages, Philadelphia, Wm. F. Fell Co., 1938, volume xxxvi.

The seventy-fourth annual meeting of the American Ophthalmological Society was held in San Francisco. Dr. Frederick Tooke of Montreal was elected president, succeeding Dr. F. H. Verhoeff. There are

25 excellent papers in this volume: 11 deal with clinical and experimental pathology, 3 are on surgical procedures, and 2 on aniseikonia.

Dr. Wm. H. Crisp advises the use of cycloplegics in refraction and the full correction of the reportive error. The discussion of this paper by Drs. Jackson, Gradle, and Lancaster reveals rather marked differences of opinion on the subject of refraction. Dr. Joseph L. McCool reviews the literature on tumors of the lacrimal sac and records a case of mixed tumor of the sac. Dr. Bernard Samuels, from a review of many proved cases of sympathetic ophthalmia, found that in 3 percent there had been a preceding panophthalmitis. The extreme importance of the correct microscopical diagnosis of sympathetic ophthalmia is emphasized.

Dr. Charles Tooker reports a case of metastatic septic endophthalmitis with ring abscess of the cornea. Dr. Arnold Knapp presents a case of orbital hyperostosis in meningioma. The ocular manifestations of brucellosis (Malta or undulant fever) and the history of the disease are reviewed by Dr. John Green. The incidence of the disease is high; the ocular symptoms and pathology resemble tuberculosis. The diagnosis of brucellosis is made by skin tests and blood agglutination tests. Dr. Derrick Vail records the syndromes of opticochiasmatic arachnoiditis with optic-nerve atrophy and blindness. The study indicates that neuro-surgery in early cases may be of value in preserving vision. Dr. Albert N. Lemoine reports an optic-tract lesion associated with infection of the sphenoidal sinuses. Dr. John Wheeler describes a new technique for correction of spastic entropion by transplanting the orbicularis muscle. Dr. Paul Chandler recommends inferior iridotomy in cataract extraction on eyes affected by iritis, cyclitis, or glaucoma. The history of American ophthalmology from 1908-1915 is given by Dr. S. Judd Beach. Dr. Arthur Bedell records three cases of traumatic retinal angiopathy. Clear photographs of the fundi are shown. Dr. Phillips Thygeson describes the Carrel technique of tissue culture and reports the cultivation of human conjunctival and corneal epithelium. Dr. Trygve Gundersen records the results of auto-transplantation of cornea into the anterior chamber. The endothelium thrives; the stroma survives and the epithelium disappears. Dr. Parker Heath and Dr. C. W. Geiter report physiologic and pharmacologic reactions of iris muscle by an autographic method. There are two papers on aniseikonia, one by Dr. Lancaster on its causes and consequences, and one by Dr. Conrad Berens, who reports that of 836 patients examined for aniseikonia 438 were given iseikonic lenses, and of these 73 percent were improved.

Dr. Gordon M. Bruce records an unusual type of retinitis found in three cases of dermatomyositis. The lesions were confined to the posterior pole of the eye and consisted of scattered grayish-yellow areas of exudates resembling cotton-wool patches. Dr. Arlington C. Krause reports on the proteins, lipids, and water-soluble extractives in fresh bovine optic nerves. Dr. P. J. Leinfelder presents the pathological findings in retrograde ganglion-cell and nerve-fiber degeneration following section of the nerve anterior to the chiasm. Dr. William Stokes, from a study of experimental keratitis, concludes that corneal corpuscles may undergo transitional forms, may act as phagocytes, and are a source of macrophage formation.

The papers reveal the continued interest in clinical pathology and the growing significance of experimental work in American ophthalmology.

Wm. M. James.

PSYCHOLOGICAL OPTICS. By Vernon W. Grant, M.A. With an introduction by Thomas G. Atkinson, M.D. Clothbound: 230 pages, bibliography, index. Published by The Professional Press, Inc., Chicago, Ill., 1938.

"Psychological optics is defined as the study of the mental side of vision." "What we see, depends largely on what we are looking for." "Visual responses are designed to adapt the organism to its environment, which means to serve its wants and preserve it from injury." "Vision, therefore, consists of conscious impressions and muscular adjustments, either voluntary or reflex." These are a few of the leading statements in this book and give a general idea of its content. The chapter headings indicate the wealth of detail covered; for example, fundamentals of behavior, as seen in general psychology and applied to vision; a discussion of the visual reaction system; visual perception; visual perception of space; attention in relation to vision; visual sensations and illusions.

One of the most interesting discussions is that of suppressed vision, which can be interpreted in terms of the psychology of habit formation. Edward Jackson more than hinted at the importance of visual psychology in discussing the problem of aniseikonia.

The book forms a liaison between physiological optics and visual impressions, and should be of concern to all ophthalmologists, particularly those interested in orthoptics, muscle anomalies, and reading difficulties.

It is well illustrated with line drawings accurately explained. However, in the reviewer's opinion, a bad psychologic impression is obtained as a result of the poorly printed small type used throughout.

Derrick Vail.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy, embryology, and comparative ophthalmology

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CONJUNCTIVA

Ruata, V. **Rickettsiosis and trachoma.** Rassegna Ital. d'Ottal., 1938, v. 7, Sept.-Oct., pp. 621-648.

The author presents a valuable critical review of our knowledge to date of the etiology of trachoma. He offers the following conclusions: An aqueous emulsion of trachomatous tissue contains a virus capable of reproducing true trachoma in the human conjunctiva. These filtrates often contain granular elements which greatly resemble Prowazek-Halberstaedter bodies and also rickettsia bodies. The inoculation of trachomatous material or the filtrate into the vitreous of rabbits produces a local nodular reaction, devoid of specific character. Inoculation of this material into other structures (testicles, glands) produces a nonspecific inflammatory reaction which cannot be proved due to the trachoma virus. Attempts to prove the existence of rickettsia bodies in trachoma by inoculation of the louse have not given a definite answer, nor have the attempts to cultivate the trachoma virus and the rickettsioid bodies by Carrel's method.

Eugene M. Blake.

Shlikova, B. D. **The use of perilla oil in the treatment of trachoma.** Viestnik Opht., 1938, v. 13, pt. 5, p. 677.

An analysis of the results of 100 cases, treated with the oil derived from the seeds of Perilla Acymoides Labiatae. It is used in topical applications and as drops instead of chaulmoogra oil, which in Russia has to be imported. The result was excellent in 17 percent of the cases, good in 36 percent, and satisfactory in 47 percent. The best results are obtained in early trachoma, with improvement setting in rapidly, and the final scars being thin.

Ray K. Daily.

Tikhonovich, I. F. **A case of bilateral tuberculous conjunctivitis palpebral and scleral.** Viestnik Opht., 1938, v. 13, pt. 5, p. 695.

The diagnosis was made by inoculation into a guinea pig, and the case recovered under a nourishing diet, cod-liver oil, ultraviolet irradiation, mer-

cury injections, and silver-nitrate and iodoform salve locally.

Ray K. Daily.

Wilson, R. P. **Heterotopic bone in conjunctiva.** Giza Mem. Ophth. Lab., 1937, 12th ann. rept., p. 50.

A male aged twelve years came to the hospital on account of a small lump under the lid in the region of the outer canthus, gradually increasing to the size of a pea. Just below the palpebral conjunctiva was found a large island of normal compact bone, and also trachoma scar and pathology.

Lawrence G. Dunlap.

Yousefova, F. I., and Bogdanovitch, S. N. **Lupus erythematosus of the conjunctiva.** Ann. d'Ocul., 1939, v. 176, Jan., pp. 27-32.

A 23-year-old patient with fibroid pulmonary tuberculosis and typical lupus erythematosus of the face also had conjunctival involvement. This consisted of small gray-white granular papules with slightly depressed centers. Biopsy showed invasion of lymphocytes, monocytes, eosinophiles, epithelioid cells, and Langhans giant cells. Tuberculin treatment was abandoned because of marked focal reactions. Some improvement was obtained with mercurials. John M. McLean.

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CORNEA AND SCLERA

Awerbach, M. I. **A case of corneal transplantation.** Viestnik Opht., 1938, v. 13, pt. 5, p. 690.

The author reports corneal transplantation in a case of corneal burn with preoperative vision 0.01 percent. The final visual result, thirteen months after operation, was normal visual acuity. Ray K. Daily.

Castroviejo, Ramon. **Corneal implant.** Rev. Oto-Neuro-Oft., 1938, v. 13, Sept., p. 205.

This is a Spanish adaptation of a collective review which appeared in Surgery, Gynecology, and Obstetrics, 1937, v. 65, p. 589. Edward P. Burch.

Edison, S. M. **Interstitial keratitis treated with zinc ionization.** Illinois Med. Jour., 1938, v. 73, May, p. 405.

The author states that zinc ionization seems to be of benefit in promoting absorption of infiltrates and scars in interstitial keratitis, especially if his method and electrodes are used.

Theodore M. Shapira.

Golubeva, K. **Metastatic ocular involvement in influenza pneumonia.** Viestnik Opht., 1938, v. 13, pt. 4, p. 543.

In twenty years at the ophthalmic hospital in Tul there were four cases of metastatic episcleral abscess complicating respiratory infections. In three the causative agent was the staphylococcus and in one the pneumococcus of Frankel. In the latter case there were at the same time iritis and neuritis; also the inflammatory symptoms were less acute, the course less stormy, and the final result better than in the cases caused by the staphylococcus.

Ray K. Daily.

Katznelson, A. B. **Epibulbar tuberculosis.** Viestnik Opht., 1938, v. 13, pt. 4, p. 507.

A review of the literature and a report of three cases of tuberculous keratoconjunctivitis, with the diagnosis verified by animal inoculation. One case presented a large solitary granuloma at the limbus, the second a localized process involving the cornea and adjacent conjunctiva, and the third a diffuse infiltrative process of the cornea and con-

junctiva. The clinical findings and the pathologic pictures of tissues excised for biopsy refute the contention of Junius that true epibulbar tuberculosis occurs only in the form of small nodules, with slow and insignificant necrosis and with a scanty content of bacilli. The authors' conclusion is that epibulbar tuberculosis takes various and transitional forms. It develops as a result of subconjunctival infection and spreads superficially and deeply. Epibulbar tuberculoma is usually associated with severe generalized tuberculosis and is the result of a hematogenous infection. Its prognosis is serious for the eyeball and for life. Its therapy should consist of constitutional stimulation and of the various forms of irradiation. (Photomicrographs.)

Ray K. Daily.

Knapp, A. A. **Results of vitamin-D-complex treatment of keratoconus.** Amer. Jour. Ophth., 1939, v. 22, March, pp. 289-292.

Kostenko, F. M. **Treatment of trachomatous pannus with cadaver mucous membrane, preserved on ice.** Viestnik Opht., 1938, v. 13, pt. 4, p. 500.

For Denig's transplantation Kostenko uses mucous membrane excised from lips of cadavers and preserved on ice from one to six days. In nine cases he found the material suitable, taking readily, and having a favorable effect on old cases of trachoma. It was gradually absorbed and left no cosmetic blemish. The author recommends suturing the transplant to the tendons of the four recti muscles. Ray K. Daily.

Krachmalnikov, L. K. **The etiology of filamentous keratitis.** Viestnik Opht., 1938, v. 13, pt. 4, p. 558.

A report of a case which the author attributes to ovarian hypofunction.

Ray K. Daily.

Medvedev, H. I. **Partial keratoplasty.** Viestnik Opht., 1938, v. 13, pt. 6, p. 733.

An analysis of 24 cases. The results are not good in eyes with leucoma, and the author considers the indications for this operation very limited.

Ray K. Daily.

Moretti, Egisto. **Contribution to the surgery of trachomatous pannus.** Ann. d'Ocul., 1939, v. 176, Jan., pp. 41-52. (See Amer. Jour. Ophth., 1939, v. 22, Feb., p. 221.)

Natanson, M. C. **Requirements and indications for keratoplasty.** Viestnik Opht., 1938, v. 13, pt. 4, p. 497.

In the author's opinion the main indication is a corneal leucoma with good projection and normal intraocular tension. Extensive vascularization, adhesion, and synechia make the prognosis unfavorable. The most favorable age is from fourteen to thirty years. Syphilis may cause disagreeable operative complications and should be treated preoperatively. Patients with as much as 0.1 vision should not be subjected to transplantation. Ray K. Daily.

Rintelen, F. **Protection of the implant in optical keratoplasty.** Ophthalmologica, 1938, v. 96, Dec., p. 155.

The author anchors the implant by means of two pairs of sutures at right angles to each other, placed in the conjunctiva and traversing the cornea. To protect the corneal tissue, a sheet of gutta percha is laid between it and the sutures. A window in the gutta percha permits observation of the cornea.

F. Herbert Haessler.

Sgrosso, Salvatore. **Keratoplasty.** Rassegna Ital. d'Ottal., 1938, v. 7, Sept.-Oct., pp. 577-592.

The author reports two cases of keratoplasty, one of which was of the partial, non-perforating type, the other

done by transplanting the clear peripheral portion of the cornea to the center. So far as healing was concerned both cases were successful, but the transparency of the cornea was not maintained satisfactorily in either case.

Eugene M. Blake.

Talkovskii, S. I. **Neurologic data on the corneal processes in herpes zoster ophthalmicus.** Viestnik Opht., 1938, v. 13, pt. 5, p. 636.

A review of the literature and a report of a case with central involvement of the cornea, involvement of the trigeminal and dysfunction of the sympathetic. On this basis the author concludes that herpes zoster ophthalmicus is a tissue reaction to various types of irritant. The seat of disease is usually a portion of the trigeminal. Involvement of the Gasserian ganglion is common but the process may begin in its peripheral branches or associated nerves. The trigeminal, which morphologically and physiologically resembles the posterior nuclei of the cerebrospinal nerves, determines the biologic processes in the ectodermal portion of the cornea, and is neurotropic to the ectodermal viruses. The development of the corneal process, and its form and localization, are determined by the morphology of the neural apparatus of the cornea and the state of the nervous elements anatomically connected with it.

Ray K. Daily.

Wilson, R. P. **Bilateral multi-nodular episcleritis (tuberculides).** Giza Mem. Ophth. Lab., 12th ann. rept., 1937, pp. 87-88.

A man aged 36 years, was seen with an early bilateral ocular inflammation which progressed until multiple yellowish nodules appeared around the limbus in each eye, especially in the intermarginal area. Although much elevated, these nodules did not ulcerate and were not tender. The corneae remained clear and recovery was complete after two months treatment with tuberculin. There was no recurrence.

Lawrence G. Dunlap.

Wilson, R. P. **Leprotic keratitis.** Giza Mem. Ophth. Lab., 1937, 12th ann. rept., p. 57.

In the blind right eye of a female aged fifty years, a leper of the advanced nodular type, a fleshy granular tumor covered the cornea and sclera. The cornea of the left eye was nebulous and showed a similar fleshy pannus. Multiple nodules were scattered over the body, especially the face, arms, and hands. Ziehl-Nielsen-stained sections showed enormous numbers of B. leprae in all forms, both intracellular and extracellular. The iris and ciliary body also contained a few lepra bacilli. The choroid and retina were free from any sign of inflammatory reaction.

Lawrence G. Dunlap.

7

UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Babel, J. **Eye manifestations in a patient with the meningotyphus of swineherds.** Ophthalmologica, 1938, v. 96, Dec., p. 159.

This disease is not uncommon among the swineherds of Switzerland, France, and northern Italy. The patient in question had great lassitude and meningeal as well as abdominal symptoms in the course of a febrile disease. He had had ocular pain since the onset of fever, and on physical examination was found to have a bilateral fibrinous iritis. Cultures and animal inoculations failed to reveal a causative organism.

F. Herbert Haessler.

Bourdier, F., and Stein, M. **Traumatic cyst of the iris.** Bull. Soc. d'Opht. de Paris, 1937, Dec., p. 731.

A cyst of the iris developed at the site of an anterior synechia of iris with corneal cicatrix, twenty years after perforating injury of the globe. Three c.c. of fluid was aspirated from the cyst, and it reformed in fifteen days. Treatment discussed includes excision of that portion of the iris, aspirating contents and injecting phenol, and partial ablation. Complete removal by iridectomy was impossible because the wall of the cyst was incarcerated in the cicatrix.

Harmon Brunner.

Burnier, Penido. **Adie's syndrome.** Rev. de Oft. de São Paulo, 1938, v. 6, Oct.-Nov.-Dec., pp. 187-194.

A woman of 48 years for three years had pain in the right eye radiating to the neck, and a typical pupillotony of the same eye. The tendinous reflexes of the lower limbs were absent. Blood and cerebrospinal-fluid tests for syphilis were negative. The biomicroscope showed atrophy of the iris of the affected eye, including pigmentary border of the pupil. The author calls attention to the harm done by confusion of such cases with tabes. Adie's syndrome has nothing to do with syphilis.

W. H. Crisp.

Magitot and Morax. **The curative action of retrobulbar injections of alcohol in some cases of gonococcal iritis.** Bull. Soc. d'Opht. de Paris, 1937, Oct., pp. 617-620.

Reported in 1936, this procedure was utilized to control pain in intractable cases, and clinical improvement was observed in some. It is suggested that in this type of iritis the symptoms are due less to the number of organisms in the tissues than to the intensity of the neurovascular reaction. In the discussion, cases were reported of hemorrhagic glaucoma where relief of pain made enucleation unnecessary.

Harmon Brunner.

Michaud, Paul. **Horner syndrome provoked by retrobulbar injection of acetylcholine.** Bull. Soc. d'Opht. de Paris, 1938, March, p. 138.

A patient of 46 years with thrombosis of the central vein of the retina was given a retrobulbar injection of 50 mg. of acetylcholine, and three days later ten mg. more. After three days more the vision was much improved; but there was a paralysis of the external rectus and superior rectus muscles, and a Horner's syndrome. The paralysis disappeared, but the typical Horner's syndrome persisted.

Harmon Brunner.

Reed, J. R., and Goldfain, E. **Recurrent iritis in undulant fever with concurrent rheumatic and/or arthritic disease.** Jour. Oklahoma State Med. Assoc., 1938, v. 31, Sept., pp. 302-304.

Five cases of recurrent iritis with concurrent joint disease are reported. All five had a positive skin test and positive opsonic index for brucella, four of the five having also a positive agglutination test. Vaccine treatment produced a localized reaction in one case. The authors conclude that undulant fever was the probable cause in these cases, and that, in the absence of other cause, evidence of chronic brucellosis should be searched for in cases of iritis.

T. E. Sanders.

Reid, A. McKie. **A case of congenital aniridia fitted with pigmented contact glasses.** Trans. Ophth. Soc. United Kingdom, 1938, v. 57, pt. 1, p. 434.

A patient with aniridia which had

greatly handicapped his business and social life was fitted with a contact glass with the corneal portion opaque except for a clear central pupil. The spherical correction was −4.00 at 10 mm. in front of the cornea and gave the patient 6/6 vision.

Beulah Cushman.

Sédan, Jean. **Granuloma of the iris appearing before a pulmonary tuberculosis and permitting an earlier diagnosis.** Bull. Soc. d'Opht. de Paris, 1937, Dec., p. 701.

A large, yellow, gummatous mass appeared on the pupillary border in a twelve-year-old girl. Attention is directed to the unusual site and to the formation so very similar to a gumma. Observations cover two years.

Harmon Brunner.

Teulières, M., and Beauvieux, J. **Pearly cyst of the iris following trauma, with inclusion of an eyelash in the anterior chamber.** Bull. Soc. Franç. d'Opht., 1938, v. 51, pp. 400-405. (See Amer. Jour. Ophth., 1939, v. 22, March, p. 350.)

Zabotinskaja, R. P. **The effect of paracentesis of the anterior chamber on the course of tuberculous iritis.** Viestnik Opht., 1938, v. 13, pt. 4, p. 520.

This is the report of a laboratory study on rabbits, to verify Schieck's claims on injection of blood into the anterior chamber in tuberculous iritis. The report, based on a period of observation of six to eight months, shows that this procedure brings about a brief and transitory improvement, which is followed by exacerbation. In addition there is an unfavorable effect on the fellow eye, manifesting itself in the appearance of fresh tubercles.

Ray K. Daily.

8

GLAUCOMA AND OCULAR TENSION

Atchison, H. H. **Case of progressive atrophy of the iris and absolute glaucoma.** Trans. Ophth. Soc. United Kingdom, 1938, v. 58, pt. 1, p. 430.

A woman 35 years old, who was found to have absolute glaucoma, gave a history of an irregular pupil, first noticed twelve years previously, and which had gradually become larger and drawn nasally. Later posterior precipitates and a keratitis bullosa were found.

Beulah Cushman.

Clarke, S. T. **Mecholyl and prostigmine in the treatment of glaucoma.** Amer. Jour. Ophth., 1939, v. 22, March, pp. 249-257.

Davies, W. S. **Nevus flammeus and arrested hydrophthalmos.** Amer. Jour. Ophth., 1939, v. 22, March, p. 298.

Fradkin, M. I. **Hemato-ophthalmic barrier in chronic vagotonus and sympathicotony.** Viestnik Opht., 1938, v. 13, pt. 5, p. 647.

This laboratory investigation on rabbits demonstrates that raised sympathicotonus leads to lowering of the barrier to crystalloids. The permeability remains unchanged in increased vagotonus.

Ray K. Daily.

Kantorovich, A. I. **Sclero-iridectomy for glaucoma in the Dniepr Eye Hospital.** Viestnik Opht., 1938, v. 13, pt. 4, p. 485.

As to 79 operations, vision was improved in 67 percent of the eyes, and in 96.2 percent tension was normalized. From this experience and a review of the literature the author concludes that the procedure is as effective as any other antiglaucomatous operation.

Ray K. Daily.

Nectoux, René. **The action of yohimbine on the visual fields of a glaucoma patient.** Bull. Soc. d'Opht. de Paris, 1938, no. 2, Feb., p. 103.

The field of one eye was constricted to within 15 degrees of fixation. The other field had a nasal step. The patient refused operation. Two mg. yohimbine hydrochloride was given daily for five days. The constricted field became smaller, but the nasal step disappeared in the other eye. The intraocular tension was slightly lowered. The author concludes that yohimbine depends upon the integrity of the local circulatory system for its effectiveness.

Harmon Brunner.

Pletneva, H. A., Raeva, H. V., and Voronina, E. G. **Biologic analysis of the aqueous in glaucoma.** Viestnik Opht., 1938, v. 13, pt. 4, p. 462.

A detailed report of a laboratory investigation which recorded the effect of the aqueous on a frog's heart. The material consisted of 55 glaucomatous eyes, 41 cataractous eyes, and 2 eyes with iridocyclitis. In 40 percent of the glaucomatous eyes the aqueous contained a sympathicotropic substance, in 28.8 percent a vagotropic substance, and in 12.7 percent both.

Ray K. Daily.

Rozovskaja, S. B. **The significance of elastotonometry in the diagnosis of glaucoma.** Viestnik Opht., 1938, v. 13, pt. 6, p. 749.

A review of the literature, a detailed report of the author's own investigation on the phenomena of elastotonometry, and a comparison of data obtained by this procedure with the data afforded by the daily tension curve. The conclusions are that the elastotonometric curves show morning and evening variations. In 62.6 percent of glaucoma cases the evening curve was normal and the morning curve definitely pathologic. In 25.3 percent of glaucoma cases both the evening and morning curves were pathologic. In 12 percent of the cases the evening curves showed greater deviation from normal than the morning curves. In these cases the daily tension curve was of a reverse character. In normal eyes there was no difference between the morning and evening curves. This was true also in cases in which the intraocular tension was normalized by miotics or operation. Of 107 cases, in 103 there was agreement between the elastotonometric and daily tension curves, and only in 4 did the elastotonometric curves show greater deviation in the evening, while the intraocular tension was highest in the morning.

Ray K. Daily.

Schmelzer, H. **On the general causes of the origin of primary glaucoma.** Arch. de Oft. de Buenos Aires, 1938, v. 13, Aug., p. 401.

In an effort to determine basic causes, studies of blood chemistry were made on 55 patients suffering from primary glaucoma and on 45 patients who were free from the disease.

The most significant alteration was a hypercholesterinemia which occurred in 51 of the 55 patients with glaucoma. The author feels that hepatic dysfunction may account for the abnormal cholesterin values in the blood serum, the liver cells having lost their capacity for storing cholesterin and their power of regulating its assimilation.

In addition to orthodox local measures against primary glaucoma, such as miotics, it is suggested that a diet rich in carbohydrates and low in fats and proteins, together with small doses of insulin, may be beneficial.

Edward P. Burch.

Zaverucha, F. M., and Tebenikhina, V. I. **The effect of muscular fatigue on intraocular tension.** Viestnik Opht., 1938, v. 13, pt. 4, p. 489.

A report on a laboratory investigation relative to the effect of muscular fatigue on blood pressure, intraocular tension, and retinal blood pressure of normal athletes and glaucoma patients. In normal persons, the data obtained show no interrelation in these functions. The effect of muscular exercise on intraocular tension was inconstant. In 55 percent of the cases it was lowered, in 47 percent it was raised, and in 10.5 percent it remained unchanged. The effect of exercise on glaucoma patients was also variable, and no prediction as to its effect in an individual case is possible. Ray K. Daily.

9

CRYSTALLINE LENS

Bonnet, P., and Paufique, L., **Cataract: the value of total extraction.** Bull. Soc. Franç. d'Opht., 1938, v. 51, pp. 439-445.

After a study of two hundred such cases, the authors consider that the operation of total extraction is contraindicated in nuclear, intumescent, and hypermature cataracts. In these cases they prefer the Daviel operation. After study of two thousand cases operated upon by the method of total extraction, the authors consider this the method of choice in most cases. Careful slitlamp study is necessary to determine the anatomic classification of the cataract. In senile uncomplicated cataract, total extraction is not followed by vitreous prolapse, detachment of choroid or retina, vitreous opacities, or secondary glaucoma to any greater extent than the Daviel method. Preliminary iridectomy is recommended in cases complicated by synechiae or hypertony, and in some diabetics.

Clarence W. Rainey.

Dejean, C. **Three safety measures for facilitating total extraction of cataract.** Bull. Soc. Franç. d'Opht., 1938, v. 51, pp. 436-438.

The danger of vitreous loss prevents the wide-spread use of the method. Certain operative procedures lessen this danger. One is akinesia of the superior-rectus muscle obtained by retrobulbar injection into the inferior face of the muscle, at the junction of the middle and posterior thirds. Hypotony is the rule and the operation is begun about the tenth minute after the injection. Tonometry is used systematically. Where the tension goes up after retrobulbar injection, the operation is deferred four or five days, and the tension is then lowered by another injection. The third procedure is use of a corneoscleral suture. The author also describes his special lens forceps.

Clarence W. Rainey.

Foster, J. **Subepithelial disseminated traumatic cataract of Vogt.** Trans. Ophth. Soc. United Kingdom, 1938, v. 58, pt. 1, p. 436.

Seven months after an intraocular fragment of steel was removed from the vitreous, there was a dense central cataract with small, discrete, intensely white, subcapsular spots distributed along the lines of the sutures.

Beulah Cushman.

Graves, Basil. **Cataract and other operations during deep sleep induced by paraldehyde and omnopon.** Trans. Ophth. Soc. United Kingdom, 1938, v. 58, pt. 1, p. 309.

The author feels that in the safety of paraldehyde narcosis (in which the eye

does not roll up) speed is not a factor and cataract extraction may be done deliberately and with great caution. He combines omnopon with the paraldehyde and several days previously he usually tests its effect as to the possibility of causing vomiting. He describes his technique of cataract extraction.

Beulah Cushman.

Lagrange, Henri. **Forceps for intracapsular extraction.** Bull. Soc. d'Opht., de Paris, 1938, no. 1, Jan., p. 22.

Presentation of capsule forceps with concave surface to approximate the curve of the anterior capsule and with a concavity in the jaws. (3 photographs.)

Harmon Brunner.

Lagrange, H., and Goulesque, J. **Original technique for total extraction of cataract.** Bull. Soc. Franç. d'Opht., 1938, v. 51, pp. 432-435.

The essential points of the method are a gentle technique for avoiding injury to the zonula and ciliary body, a large corneal incision, and a conjunctival flap or bridge. The authors mention a special capsule forceps.

Clarence W. Rainey.

Porsaa, Kaj. **Posterior lenticonus.** Oft. Selskab i Köbenhavn's Forhandlinger, 1937-1938, pp. 5-7. In Hospitalstidende, 1938, Dec. 13.

This condition was discovered incidentally in a man twenty years old. The right eye was strongly myopic and the vision was limited to hand movements at two feet. The pupillary reflex showed a central dark spot surrounded by a light or dark zone according to the position of the mirror. The slitlamp revealed a symmetrically rounded bulge of the posterior capsule backward into the vitreous, which at the base measured about one fourth of the diameter of the lens. The lens was otherwise free from opacities and normal in every way. The central part of the lens was more myopic than the periphery. The left eye was hyperopic and had normal vision.

Posterior lenticonus is a very rare disorder, and since it is usually associated with lenticular opacities it is not often demonstrable with the slitlamp.

D. L. Tilderquist.

Pritzker. L. V. **The cutaneous reaction to lens albumen.** Viestnik Opht., 1938, v. 13, pt. 5, p. 673.

Among 78 cases tested, a positive reaction was obtained more frequently in cataract patients than in those with transparent lenses. In 20 percent of postoperative cataract cases, the formerly negative reaction became positive 11 to 17 days after the operation. Patients with traumatic cataracts gave the greatest percentage of positive reactions.

Ray K. Daily.

Saint-Martin. **New series of results of total extraction of cataract. The primary importance of preoperative and postoperative care.** Bull. Soc. Franç. d'Opht., 1938, v. 51, pp. 446-459.

The author presents tabular statistics concerning 237 cases of cataract removed by total extraction. A previous report had been made by the author in 1935. The results of the two series have been in agreement.

Clarence W. Rainey.

Sourdille, G. P. **Statistics as to intracapsular lens extraction.** Bull. Soc. Franç. d'Opht., 1938, v. 51, pp. 424-431.

The author discusses the results obtained in operating upon 607 cases of senile cataract by the intracapsular method. In uncomplicated cases the vision was better than 8/10 in 87 to 89 percent. The complications were post-

operative hemorrhage, which occurred in the first week in 35 cases, and loss of vitreous, which occurred in 6.7 percent of the cases.

Clarence W. Rainey.

Tille, H., Pillet, P., and Busnel, R. G. **Microincineration and microspectroscopic analysis of the normal and pathologic lens, with special regard to two cases of black cataract.** Bull. Soc. Franç. d'Opht., 1938, v. 51, pp. 407-424.

The authors conclude that in normal lens substance, in white senile cataract, and in amber cataract there is no iron, copper, or zinc in appreciable quantity. Copper was found in black cataractous lens material, especially in the lens nucleus. Iron was found in black cataract, especially in the lens periphery. Hematoporphyrin was not found.

Clarence W. Rainey.

Villard, H. **Systematic conjunctival flap in the operation for complicated cataract.** Bull. Soc. Franç. d'Opht., 1938, v. 51, pp. 459-462.

In cases where the author thinks that intraocular infection might follow cataract operation, the following procedure is used: An incision is made in the conjunctiva at the limbus, from the 9 to the 3-o'clock position, and upward dissection is done. Two vertical sutures, fastened above and below, serve to draw the flap securely down over the wound, and to cover most of the cornea.

Clarence W. Rainey.

10

RETINA AND VITREOUS

Ballantyne, A. J., Michaelson, J. C., and Heggie, J. F. **Vascular changes in the retina, optic nerve, brain, and kidney: a clinical and pathologic study.** Trans. Ophth. Soc. United Kingdom, 1938, v. 58, pt. 1, p. 255.

Ophthalmoscopic observation was followed by histologic examination of pipe-stem sheathing of a central retinal artery, with parallel studies of comparable arteries of the kidney and brain. The vessels showed marked proliferation of the subendothelial cells and multiplication of the elastic fibers, causing irregular thickening of the intima and narrowing of the lumen. The thickened cellular intima undergoes complete disintegration into a fatty débris producing the ophthalmoscopic picture as seen. (Illustrations.)

Beulah Cushman.

Bonnet, M. P. **Pigment streaks of retina as sequela after detachment of choroid following intracapsular cataract extraction.** Bull. Soc. d'Opht. de Paris, 1938, no. 1, Jan., p. 55.

A diabetic patient had a massive detachment of the choroid, starting in the superior temporal quadrant, becoming annular, and reaching almost to the macula. After several days the detachment disappeared. The limits of maximal detachment are marked permanently by a fine, black, broken, and sinuous line.

Harmon Brunner.

Bourne, M. C., Campbell, D. R., and Tansley, K. **Retinitis pigmentosa in rats.** Trans. Ophth. Soc. United Kingdom, 1938, v. 58, pt. 1, p. 234. (See Amer. Jour. Ophth., 1939, v. 22, Jan., p. 94.)

Couadau and Planques. **Hypertensive neuroretinitis disappearing under medical treatment, recurring during pregnancy, and with slow recovery following premature delivery.** Bull. Soc. d'Opht. de Paris, 1938, no. 1, Jan., p. 40.

A patient 35 years of age presented in the left eye papilledema, small plaques of exudate, and peripheral hemorrhages. General measures and

acetylcholine medication were instituted. In two months the fundi were normal. One year later (the patient being seven months pregnant) there was an intense albuminuric retinitis in each eye. Seven months later all evidences of retinitis had disappeared. The case is cited as proof that in such cases findings of albuminuric retinitis are not permanent; and that they may represent nephritic exacerbation.

Harmon Brunner.

Dax, E. C. **A melanosome-dispersing substance in the blood and urine of cases with retinitis pigmentosa.** Trans. Ophth. Soc. United Kingdom, 1938, v. 58, pt. 1, p. 227.

A substance which will expand the melanophores of the frog is shown to be present in the blood and urine of patients with retinitis pigmentosa. Its chemical properties resemble those of the melanosome-dispersing hormone of the pituitary body. Melanophore expansion in frogs was obtained by injection of blood and urine of twenty patients with retinitis pigmentosa. A similar effect was produced by the urine in pituitary abnormalities or physiologic stress. (Illustrations.)

Beulah Cushman.

Elsberg, C. A., and Spotnitz, H. **Factors which influence dark adaptation.** Amer. Jour. of Physiology, 1937, v. 120, Dec., p. 689.

As to the effect of bright light in dark adaptation, time is of greater importance than intensity.

Theodore M. Shapira.

Elsberg, C. A., and Spotnitz, H. **The neural components of light and dark adaptation and their significance for the duration of the foveal dark adaptation process.** Bull. Neur. Inst. New York, 1938, v. 7, Sept., p. 148.

Most of the studies were made with red light. To perceive a dimly illuminated object following light adaptation, a message must be transmitted to the visual centers from the retina. The retinal sensitivity increases comparatively rapidly. A longer period of time is necessary before the energy produced in the photosensitive elements of the retina can be perceived. The time required for foveal dark adaptation is in all probability determined by the comparatively slow response of neural areas to weak stimuli after previous light adaptation.

F. M. Crage.

Jeandelize and Thomas. **The influence of adrenalin and hypophyseal extract on the curve of dark adaptation in some cases of retinitis pigmentosa.** Bull. Soc. d'Opht. de Paris, 1937, Oct., pp. 608-612.

In such cases the visual threshold is above that of normal eyes. It was found that hypophyseal extract raised and adrenalin lowered the threshold. Drugs were administered by injection.

Harmon Brunner.

Law, F. W. **A contribution to the pathology of angioid streaks.** Trans. Ophth. Soc. United Kingdom, 1938, v. 58, pt. 1, p. 191.

A review of the different theories of the etiology of angioid streaks is given, with histologic description of a case in which the author showed pictures of the fundi. There was a history of injury to the right eye and an acute gastric ulcer with profuse hemorrhage to which the patient succumbed. Pathologic examination showed folds in the retina, with no breaks in Bruch's membrane.

Beulah Cushman.

Linksz, A., and Raskó, J. **Examinations with the Kukan ophthalmody-**

namometer. Therapia (Hungarian), 1938, v. 15, June, p. 126.

By means of negative pressure the eyeball is held fast and pressed against the rim of a suction cup of 13-mm. diameter. Thus the intraocular pressure is raised, and the appearance and collapse of the arterial and venous pressure are observed with the ophthalmoscope. The eye having an autochthonous regulatory mechanism, the intraocular pressure is in great degree independent of the general blood pressure. The authors found great variations from the ideal rule that the diastolic pressure in the brachial is twice as high as the retinal diastolic pressure. Further they established the following connections: If the intraocular pressure rose above 25 mm. Hg the retinal diastolic pressure was always found to be higher than 40 mm. Hg, and if the retinal diastolic pressure was greater than 65 mm. Hg the ocular tension was higher than 24 mm. Hg. Similarly, if the intraocular pressure was less than 13 mm. Hg the retinal diastolic pressure was never higher than 40 mm. Hg. While in one man the diastolic pressure of the brachial was 65 mm. Hg, the retinal diastolic pressure differed in the two eyes, being 40 and 60 mm. Hg respectively, while the intraocular tension of the two eyes correspondingly was 16 and 25 mm. Hg. R. Grunfeld.

Michaud, Paul. **The oculocardiac reflex observed after a retinal-detachment operation.** Bull. Soc. d'Opht. de Paris, 1938, March, p. 136.

Thirty-six hours postoperatively the patient had an attack of vomiting and pulse was reduced to 40. The bradycardia was relieved by atropine. The site of operation was in the superior nasal quadrant of the right eye. It is presumed the ciliary nerves were damaged, causing a central vagus stimulation. Harmon Brunner.

Nagy, Ferenc. **Vasodilator substances in diseases of the eyeground.** Magyar Orv. Arch. (Hungarian), 1938, v. 39, p. 643.

The author describes four cases in which he obtained some improvement in visual acuity by amyl-nitrite inhalation or acetylcholin injection. The treatment is indicated in albuminuric retinitis, choroiditis, atrophy of the optic nerve, retinitis pigmentosa, and so on. Although the vasodilators frequently fail to fulfil the expectations based upon them, the few instances in which they improve vision and increase the visual field make it desirable to try their application in every case indicated. R. Grunfeld.

Offret, G. **Bilateral venous retinal lesions in a young girl, preceding by two months the appearance of recurrent vitreous hemorrhages.** Bull. Soc. d'Opht. de Paris, 1937, Oct., pp. 578-587.

This patient had a vasomotor instability more evident in the extremities. Complete physical studies and tests revealed only a prolonged blood-clotting time. The fundi showed venous tortuosities, thrombi, flame-shaped retinal hemorrhages, and frequent areas of periphlebitis. These became more marked distally. No immediate cause of the vitreous hemorrhages was found in spite of hospitalization. Etiology is discussed. (2 plates, 6 references.)
Harmon Brunner.

Strachov, V. P. **Intracapsular cataract extraction.** Viestnik Opht., 1938, v. 13, pt. 4, p. 454. (See Amer. Jour. Ophth., 1939, v. 22, Feb., p. 230.)

Vilenkina, A. I. **The fundus in the diagnosis, prognosis, and course of hypertension.** Viestnik Opht., 1938, v. 13, pt. 4, p. 470.

A tabulated report of examination of 28 patients with hypertension relative to blood chemistry, blood pressure, retinal pressure, and fundus changes. The author shows that the ocular findings are indicative of the phase, character, and course of hypertension. He therefore urges close coöperation between internist and ophthalmologist. He suggests the term "hypertensive fundus" for the early stages of essential hypertension, and "arteriosclerotic retinopathy" for its late stages. "Angiospastic retinitis," indicative of malignant hypertension, should be replaced by the term "ischemic retinopathy."

Ray K. Daily.

Wilson, R. P. **Neuroretinitis (probably bilharzial in origin).** Giza Mem. Ophth. Lab., 1937, 12th ann. rept., pp. 88-89.

This is the second case in recorded medical literature of neuroretinitis of bilharzial origin. The first case was reported in 1924. Both patients were young males, aged respectively 25 and 21 years. In each case the left eye was affected and the fundus lesions consisted of several rounded white or yellowish-white spots near the temporal side of the disc or in relation to the temporal vessels. In both cases the size of the spots was the same (about 1/3 d. d.) and small macular hemorrhages were present. Both cases cleared up under antimony tartrate injections.

Lawrence G. Dunlap.

Wilson, R. P. **Recurrent intraocular hemorrhages (Eales's disease) in two brothers.** Giza Mem. Ophth. Lab., 1937, 12th ann. rept., pp. 90-92.

Brothers, aged 29 and 30 years, developed retinal hemorrhages which cleared up under injections of calcium and vitamin C on alternate days over a period of seven weeks. One regained practically normal vision and the other vision of 0.1, with continued recurring hemorrhages. Lawrence G. Dunlap.

11

OPTIC NERVE AND TOXIC AMBLYOPIAS

Baltin, M. M. **Roentgenography of the optic canal.** Viestnik Opht., 1938, v. 13, pt. 5, p. 613.

A comprehensive review of the subject, and a description of the author's method, which employs a cassette covering both orbits, and two X-ray tubes. The indications are illustrated by case reports. (Illustrations.)

Ray K. Daily.

Fridman, S. I. **Data on the use of amyl nitrite in the therapy of optic atrophy.** Viestnik Opht., 1938, v. 13, pt. 6, p. 784.

A report of three cases of optic atrophy and three cases of retrobulbar neuritis, treated without improvement with amyl nitrite inhalations.

Ray K. Daily.

Gasova, O. A., and Milovidova, A. H. **A case of brucellosis involving the nervous system, with bilateral optic neuritis as the initial symptom.** Viestnik Opht., 1938, v. 13, pt. 4, p. 538.

A young woman, nineteen years old, was taken sick with an acute angina and bilateral optic neuritis. The joints became involved later, and two months after onset of the disease the patient developed spinal myelitis. The diagnosis was made serologically. Vision improved from light perception to 0.01 in

the right eye and 0.05 in the left, with central scotomata remaining.

Ray K. Daily.

Jensen, Peter. **Four cases of quinine poisoning.** Oft. Selskab i Köbenhavn's Forhandlinger, 1937-1938, pp. 23-25. In Hospitalstidende, 1938, Dec. 13.

The patients were young women who took the drug in dosages of five to twenty grams to produce abortion. All promptly developed nausea, weakness, noises in the ears, and loss of vision. The pupils were dilated and did not react to light, and the fundi showed a picture resembling that of embolus of the central artery.

Amyl nitrite, acetylcholin, and diuretin were used in treatment. In all instances the vision finally became normal, but the visual fields remained contracted and the discs pale.

D. L. Tilderquist.

Khurgina, E. A. **Sympathectomy in optic atrophy.** Viestnik Opht., 1938, v. 13, pt. 6, p. 792.

A report of six cases of pericarotid sympathectomy with improvement only in one case in which preoperative vision was 0.5. Ray K. Daily.

King, J. E. J. **Oxycephaly. A new operation and its results.** Arch. Neur. and Psychiatry, 1938, v. 40, Dec., p. 1205.

In oxycephaly, a premature closure of the skull sutures prevents normal expansion of the brain in its growth. Ocular results of this condition include exophthalmos, papilledema, and later optic atrophy. The author reports the case of an eight-year-old boy operated on in two stages, first on one side of the skull, and ten weeks later on the other side. The operative procedure consisted in making a number of burr holes through the skull about 5 cm. apart, and connecting these holes by linear cuts through the bone. The result was a mosaic of skull fragments resting on the dura, allowing the brain to expand by further separation of the fragments. Subjective and objective improvement of the patient were noted. (Illustrations.) George A. Filmer.

McAlpine, Douglas, **Familial neuromyelitis optica: its occurrence in identical twins.** Brain, 1938, v. 61, Dec., p. 430.

The clinical and pathological features of neuromyelitis optica as it occurred in identical twins are described. It is concluded that it is a distinct member of the demyelinating group of diseases.

T. E. Sanders.

Skydsgaard, H. **Intermittent choked discs in intracranial tumors.** Oft. Selskab i Köbenhavn's Forhandlinger, 1937-1938, pp. 25-32. In Hospitalstidende, 1938, Dec. 13.

Two cases of intracranial tumor are cited in which over a period of five years or more there appeared recurring attacks of increase in intracranial pressure with marked choked disc, followed by improvement in symptoms and disappearance of the papilledema. In one instance a tumor was found in the right frontal lobe and the periodic attacks had undoubtedly been caused by intermittent hemorrhage from the tumor. In the other case, the tumor was located at the base of the brain near the tentorial incisure, and caused direct pressure and blocking of the ventricles, especially the third. Since the tumor was partly cystic the periodicity of the pressure might be explained by intermittent emptying and refilling of the cysts.

D. L. Tilderquist.

Watkins, A. L. **The cerebrospinal fluid in optic neuritis, "toxic amblyopia," and tumors producing central scotomas.** New England Jour. Med., 1938, v. 220, Feb. 9, pp. 227-231.

The cerebrospinal-fluid findings in 120 cases of acute and chronic retrobulbar neuritis, "toxic amblyopia," and tumors producing central scotomas are reported. In acute retrobulbar neuritis without demonstrable cause the spinal fluid was normal except in older cases associated with known multiple sclerosis (25 to 50 percent). In these there were a few lymphocytes, a high normal protein and a strong first-zone gold-sol reaction. The spinal fluid was normal in so-called chronic retrobulbar neuritis, and in 95 percent of the cases of probable "toxic amblyopia." In all patients with tumor or aneurysm producing central scotoma, the spinal-fluid protein was increased two to five times. This proved to be a valuable differential point. T. E. Sanders.

Whiteside, W. C. **Leber's hereditary optic neuritis through six generations—a sterilization problem.** Canadian Med. Assoc. Jour., 1938, v. 39, Oct., p. 347.

The patient was one of 23 afflicted male members of the same family, through six generations. A brief description of the disease and its incidence and mode of transmission is given. Closer and continued coöperation between ophthalmologist and surgeon is urged, so that such a hereditary link may be broken by proper sterilization procedure. F. M. Crage.

12

VISUAL TRACTS AND CENTERS

Elsberg, C. A., and Spotnitz, H. **A comparison of a series of olfactory and visual tests for the localization of tumors of the brain.** Bull. Neur. Inst. New York, 1938, v. 7, Sept., p. 165.

In 126 patients both olfactory and visual tests were made and in 31 of these a tumor of the brain was present, localized and verified by encephalography or ventriculography, and operation or autopsy. The experiences of the authors indicate that these tests are useful for localization of supratentorial tumors of the brain and are mutually confirmatory. Exact and probable localizations of tumors of the various lobes by these tests are discussed.

F. M. Crage.

Guillermin, M., and Pesme, J. **Pneumococcic arachnoiditis of the optic chiasm.** Bull. Soc. d'Opht. de Paris, 1938, no. 1, Jan., p. 16.

The report relates to a patient complaining of abrupt diminution of vision to O.D. 0.01, O.S. 0.2, and having bilateral papilledema, contracted fields, and a quadrant field defect. All laboratory tests and examinations were negative. The symptoms progressed. In the search for infection, the optic chiasm was exposed and was found to be covered with a greatly congested arachnoid. The optico-chiasmal cistern was greatly distended with cloudy fluid. The spinal fluid was consistently negative. Later general meningitis developed. Necropsy showed the optic chiasm to be the site of primary infection. Routes of infection are discussed. The authors present the case in the belief that many light cases are overlooked and undiagnosed, and also to refute doubt of the existence of the arachnoid in this area. Harmon Brunner.

13

EYEBALL AND ORBIT

Benedict, W. L. **Problems in the diagnosis of abscess and tumor of the**

orbit. Amer. Jour. Ophth., 1939, v. 22, March, pp. 292-297; also Trans. Pacific Coast Oto-Ophth. Soc., 1938, 26th mtg.

Berz, A. L. **An atypical case of true posterior staphyloma.** Viestnik Opht., 1938, v. 13, pt. 4, p. 545.

A report of a case in a high myope 39 years old. The optic disc was not included in the staphyloma, and the ectatic area was darker in color than the rest of the fundus. The author regards this phenomenon as an anomaly in development; he cites the presence of a misplaced lacrimal punctum in the same eye as supporting this contention.

Ray K. Daily.

Bonnet and Paufique. **Unilateral exophthalmos related to a large cystic tumor of the greater wing of the sphenoid.** Bull. Soc. d'Opht. de Paris, 1938, March, p. 173.

A male of 57 years had exophthalmos progressive since 1917. There was a large cyst in the greater wing of the sphenoid, and since 1921 the contents of the cyst had been drained by puncture several times a year. Cystic formation of the sphenoid crowding into the orbit could be palpated laterally. There was no pain. The type of cyst was not known. Discussion brought out two more cases of similar nature. One died of another cause. One had become stationary for several years.

Harmon Brunner.

Dragoiu, I., and Crisan, C. **Correlation between the development of the crystalline lens and that of the optic vesicle, in relation to an ocular anomaly.** Bull. de l'Acad. de Méd. de Roumanie, 1938, v. 5, no. 3, pp. 305-308.

In examining serial frontal sections of the head of a frog tadpole which to the naked eye showed left anophthalmia, there was found in the left orbit an oval formation surrounded by abundant mesenchymatous tissue. Detailed study showed that the primary optic vesicle had been prematurely separated from the cerebral vessels, probably by mechanical rupture of the optic pedicle. There was no trace of vitreous, cornea, crystalline lens, or iris; but well-developed oculomotor muscles were found inserted into the primitive sclera.

W. H. Crisp.

Lamb, H. D. **The retina in septic and chronic endophthalmitis of ectogenous origin.** Amer. Jour. Ophth., 1939, v. 22, March, pp. 258-266.

Magitot. **Subconjunctival injection of adrenalin, and exopthalmos in man.** Bull. Soc. d'Opht. de Paris, 1937, Dec., p. 721.

The injection was made to secure mydriasis in a case of uveitis. In ten minutes retraction of the upper lid and mild exophthalmos developed. When yohimbine was injected before the adrenalin this did not occur. Though the experience is common in animals, the author finds no previous recorded instance in man. He attributes it to action upon the sympathetics.

Harmon Brunner.

Marine, David. **Studies on the pathological physiology of the exophthalmos of Graves' disease.** Annals of Internal Med., 1938, v. 12, Oct., p. 443.

Important factors in production and maintenance of exophthalmos are increased anterior pituitary activity, relative or absolute thyroid insufficiency, and increased functional activity of the interstitial cells of the gonads. The exophthalmos following thyroidectomy in rabbits can be cured by the administration of thyroxin or by gonadectomy.

Other factors may be the functional activity of the adrenal cortex and Ca and P metabolism. (Illustrations.)

George A. Filmer.

Naffziger, H. C. **Progressive exophthalmos associated with disorders of the thyroid gland.** Annals of Surg., 1938, v. 108, Oct., p. 529.

Naffziger considers the status of three patients who have progressive exophthalmos associated with disorders of the thyroid gland and in whom the exophthalmos has progressed to the point where not only the vision but the lives of the patients are threatened.

Theodore M. Shapira.

Nikhinson, A. G. **The orbital complications of sinusitis in childhood.** Viestnik Opht., 1938, v. 13, pt. 4, p. 530.

A report of two cases of orbital phlegmon complicating nasal sinusitis. In both, the orbits were drained externally and the sinuses intranasally. The final result was recovery, with loss of vision in one case. Ray K. Daily.

Polonskii, S. P. **Recurrent exophthalmos and choked disc caused by Quincke's edema.** Viestnik Opht., 1938, v. 13, pt. 5, p. 669.

The patient came from a family with cardiovascular disturbances, and from childhood was subject to attacks of migraine and urticaria. When she was 28 years old the attacks of urticaria were followed by exophthalmos, reduced visual acuity, and choked disc in the left eye. For the first three years the eye returned to normal between the attacks. After that there remained between the attacks some exophthalmos, slight choking of the disc, and some reduction of visual acuity. The history and course of the disease led the author to conclude that this was a case of Quincke's edema. Ray K. Daily.

Rameev, P. C. **Orbital cellulitis in erysipelas of the face.** Viestnik Opht., 1938, v. 13, pt. 5, p. 667.

A report of a case with recovery under conservative treatment.

Ray K. Daily.

Sobol, I. M. **Clinical observations on the role of the nasal sinuses in inflammations of the orbit.** Viestnik Opht., 1938, v. 13, pt. 4, p. 524.

A tabulated report of ten cases of orbital cellulitis, with recovery in eight. The author maintains that conservative therapy is ineffective, and drainage of the orbit alone without simultaneous drainage of the nasal sinuses is inadequate. Ray K. Daily.

Wald, G., Jeghers, H., and Armino, J. **An experiment in human dietary nightblindness.** Amer. Jour. of Physiology, 1938, v. 123, Sept. 1, p. 732.

The dark adaptation of a human subject was measured at regular intervals during a long control period, and during a subsequent period on a diet containing only 50 to 200 U. S. P. units daily of vitamin A, but otherwise complete. A first effect of the deficiency diet was noted within 24 hours. Within 25 days, the threshold of the dark-adapted rods had risen about fifty times that of the dark-adapted cones, which had risen fourfold. Following temporary cure of the initial nightblindness with a single dose of vitamin A, hemeralopia reappeared with greatly increased rapidity. The development of hemeralopia was repeatedly checked temporarily by oral administration of vitamin A or carotene. After intramuscular injection of colloidal carotene the hemeralopia threshold improved to within seven minutes.

Theodore M. Shapira.

Wilson, R. P. **Coloboma of the upper lid with microphthalmos and dermoid of cornea.** Giza Mem. Ophth. Lab., 1937, 12th ann. rept. pp. 82-85.

A female infant, aged 27 days, had a soft mass about 1 cm. in diameter in the anterior part of the right orbit, protruding through a wide coloboma in the nasal half of the upper lid. The coloboma involved about one half of the ciliary margin and portions of the normal lid lay free on each side of the protruding mass. The tumor extended backward into the orbit and the conjunctiva had a bluish tinge suggestive of underlying sclera. Eight months later the condition having remained stationary, the tumor was excised. On the back of the tumor was a small pigmented cyst (microphthalmic eye) the size of a small pea, and with tough walls. The tumor mass replaced the cornea, anterior chamber, and iris, and there was no trace of lens. The posterior portion of the specimen showed a narrow cavity lined by retinal pigment epithelium.

Lawrence G. Dunlap.

Wilson, R. P. **Streptothricial granuloma of orbit.** Giza Mem. Ophth. Lab., 1937, 12th ann. rept., p. 70.

A female aged fifteen years, with swelling and drooping of the left upper eyelid for about three months, had a firm hard tumor extending along the whole of the superior orbital margin and deep into the orbit, attached to the periosteum but not to the skin. A piece removed for diagnostic examination showed mycelial filaments, polymorphonuclears, plasma cells, lymphocytes, macrophages, giant cells, and newly formed capillaries, typical of the nodules of actinomycosis.

Lawrence G. Dunlap.

14

EYELIDS AND LACRIMAL APPARATUS

Csillag, Franz. **Primary chancre of the eyelid.** Orvosi Hetilap (Hungarian), 1939, v. 83, Jan. 7, p. 11.

A portion of the lower eyelid near the inner canthus became swollen and subsequently thickened and hard. A yellowish crust formed upon the surface and later the upper eyelid showed a similar change. No ulceration was noted. Although the epithelium became desquamated the denuded surface was not moist. The tear duct was not permeable. Close to the duct a hard nodule was palpable. The preauricular gland was enlarged. The Wassermann reaction was strongly positive. Since upon institution of antisyphilitic treatment a rapid cure set in, the condition was diagnosed as primary syphilitic ulcer.

R. Grunfeld.

Desvignes, Pierre. **Syphilis of the lacrimal duct simulating acute dacryocystitis.** Bull. Soc. d'Opht. de Paris, 1938, no. 1, Jan., p. 13.

The author says that a review of literature shows only twelve cases of acute syphilitic infection of the sac. A female aged 36 years had all the signs of an acute infection. Diagnosis was suggested by a nasal ulcer; and was confirmed serologically and therapeutically.

Harmon Brunner.

Morgan, O. G. **Observation on the treatment of epiphora, with special reference to some cases treated by dacryocystorhinostomy.** Trans. Ophth. Soc. United Kingdom, 1938, v. 58, pt. 1, p. 163.

A review of the different methods of treatment of congenital occlusion of the lacrimal duct is given, with details of operative interference according to the

Dupuy-Dutemps modification of Toti's method. This technique was used satisfactorily in children, and in adults where probing had failed.

Beulah Cushman.

Offret, A., and Offret, G. **Operative attempt in a case of Marcus-Gunn phenomenon.** Bull. Soc. d'Opht. de Paris, 1938, no. 2, Feb., p. 61.

The patient had an associated ptosis when the eye was at rest, and a tremor of the upper lid when the jaw was moved to the opposite side. A longitudinal strip of tarsus was sutured to the insertion of the superior rectus. The ptosis was relieved and the jaw winking stopped. (9 references.)

Harmon Brunner.

Palin, Anthony. **Abnormal angulation of palpebral fissures.** Trans. Ophth. Soc. United Kingdom, 1938, v. 58, pt. 1, p. 457.

A plastic operation is described for repair of the palpebral fissure, which angulated down 15°. A long triangular flap of skin and orbicularis muscle base outward was transplanted from the upper lid to the lower to raise the canthus. Beulah Cushman.

Paradoksov, L. F. **Surgical treatment of cicatricial entropion of the lower lid.** Viestnik Opht., 1938, v. 13, pt. 4, p. 550.

The author's procedure consists in excision of a strip of skin over the tarsus, splitting the tarsus, and suturing in such a manner that the upper segment of the tarsus with its overlying conjunctiva is turned on its axis and becomes displaced upward and forward.

Ray K. Daily.

Saint-Martin, R. de. **A modification of the Motais technique for the correction of ptosis.** Bull. Soc. d'Opht. de Paris, 1938, no. 2, Feb., p. 100. (See Amer. Jour. Ophth., 1938, v. 21, Dec., p. 1433.)

Shershevkaja, O. I. **Congenital coloboma of the lids.** Viestnik Opht., 1938, v. 13, pt. 6, p. 822.

A report of two cases. In one the colobomata represented the only abnormality. In the second case there were cicatrices on the skin of the lids, and shortening of the bridge of the nose and of the alveolar process of the superior maxilla. In this case the author attributes the anomaly to amniotic adhesions. The pathogenesis of the first case is not clear. Ray K. Daily.

Valière-Vialeix. **A case of enormous distention of the lacrimal sac.** Bull. Soc. d'Opht. de Paris, 1937, Dec., p. 696.

Dilatation resulted from chronic dacryocystitis. The sac held 30 c.c. of fluid. It is the second largest reported.

Harmon Brunner.

Venco, Luigi. **The technique of dacryocystorhinostomy by the external route.** Rassegna. Ital. d'Ottal., 1938, v. 7, Sept.-Oct., pp. 593-612.

In an experience with 200 cases of dacryocystorhinostomy, Venco has found certain procedures of value. He administers a blood coagulant in advance and gives a sedative before the operation. Novocaine infiltration is done externally and a pledget of 5-percent cocaine with adrenalin is placed in the nose. The incision is slightly longer than that for removal of the sac. After the skin incision is made a diathermy bistoury is used for deep dissection.

The author discusses various measures for checking hemorrhage. The sac is freed from surrounding tissues, except at the canaliculi and the dome, and a colored fluid is injected into the sac to aid identification. Bone removal

is done with an 8-mm. electrically driven trephine. The sac and nasal mucous membrane are united by 000 catgut or silk, and when suturing is impossible a rubber tube is tied in place.

Eugene M. Blake.

Wilson, R. P. **Elephantiasis lymphangioides of the eyelids,** Giza Mem. Ophth. Lab., 1937, 12th ann. rept., pp. 85-86.

A female, aged sixteen years, was treated with a red-hot cautery for a boil on the lower border of the right jaw, over the external maxillary vessels. A dense scar over the angle of the jaw was followed by swelling of the face and thickening and ptosis of the right upper eyelid. Tarsectomy was performed to reduce the thickness and weight of the lid, and microscopic examination of the excised tissue showed greatly dilated lymphatics and filling of the subcutaneous tissues with myxomatoid material.

Lawrence G. Dunlap.

Wilson, R. P. **Retention cyst of accessory lacrimal gland (dacryops).** Giza Mem. Ophth. Lab., 1937, 12th ann. rept., p. 59.

A female aged 25 years had in the vicinity of the right lacrimal gland a swelling of the right upper eyelid of ten days duration. It appeared to be cystic, lobulated, and freely movable, and of the size of a large chestnut. It was removed. The pathologic diagnosis was retention cyst of the accessory lacrimal gland, secondary to ascending inflammation. Lawrence G. Dunlap.

Zatz, L. B. **An operation for ectropion of the lower lid.** Viestnik Opht., 1938, v. 13, pt. 4, p. 554.

A description of the Imre operation. (Illustrations.) Ray. K. Daily.

15
TUMORS

Doherty, W. B. **Melanosarcoma of the iris.** Amer. Jour. Ophth., 1939, v. 22, March, pp. 239-249.

Lane, L. A. **Occupation in relation to cancer of the eye and adnexa.** Amer. Jour. Ophth., 1939, v. 22, March, pp. 267-273.

Meighan, S. and Michaelson, J. C. **A case of glioma retinae with special reference to the mode of spread.** Trans. Ophth. Soc. United Kingdom, 1938, v. 58, pt. 1, p. 208.

The authors give the clinical and pathological findings in a 3½-year-old child with bilateral retinal glioma. The involvement of the right eye extended to the optic disc, choroid, and anterior part of the nerve. The progress backward in the nerve was interrupted for 1 mm. Its reappearance in the nerve continued for 0.60 mm. and was associated with partial necrosis of nerve fibers and implantation of small secondary nodules in the subarachnoid space. The authors conclude that this examination exemplifies the fallacy of basing operative procedure on the condition of the cut end of the optic nerve, and they advise consideration of exenteration of the orbit if the choroid is found to be involved. Beulah Cushman.

Montpellier, J., Toulant, P., Foissini, J. **Ganglio-neuro-schwanno-spongioblastoma of the orbit.** Ann. d'Ocul., 1939, v. 176, Jan., pp. 18-27.

An eight-year-old Arab boy had proptosis of the left eye of two-months duration without other symptoms. An adherent solid tumor was removed from the orbit. Deep X-ray therapy was given for two months. Seven months after the first operation the tumor had

recurred with marked proptosis, loss of vision, and corneal erosion. Exenteration of the orbit was followed by further radiation.

Histologic examination of the first specimen showed a malignant ganglioneuroma. The second specimen was a classical spongioblastoma.

The literature on neurogenic tumors of the orbit is discussed, and the possibility of two separate tumors is dismissed in favor of one complex ganglio-neuro-schwanno-spongioblastoma. (Bibliography.) John M. McLean.

Wilson, R. P. **Adenocarcinoma of meibomian gland.** Giza Mem. Ophth. Lab., 1937, 12th ann. rept., p. 45.

A female aged 45 years had noted a growing tumor of the left upper eyelid for the previous two years. Two operations had been unsuccessful. After removal the histopathologic appearances suggested that the growth had arisen from a sebaceous (meibomian) gland. Lawrence G. Dunlap.

Wilson, R. P. **Capillary angioma secondary to xeroderma pigmentosum.** Giza Mem. Ophth. Lab., 1937, 12th ann. rept., p. 47.

A female aged nine years had begun to develop signs of xeroderma pigmentosum when only one year old. This progressed until pigmented areas and atrophic patches were scattered over the whole body. A red sessile tumor the size of a small bean, attached to the ciliary border of the intermarginal strip of the left upper eyelid, was removed. Photophobia was due to diffuse trachomatous keratitis. Tumor sections showed a typical capillary angioma, with no evidence of malignancy.

Lawrence G. Dunlap.

Wilson, R. P. **Cavernous hemangioma of bulbar conjunctiva.** Giza Mem. Ophth. Lab., 1937, 12th ann. rept. p. 52.

A male aged 35 years had noted for five years a small red mass on his right eye, 3 mm. in diameter and lying midway between the caruncle and the nasal limbus. It was movable with the conjunctiva. Trachoma accompanied the condition. Pathologic examination revealed the type of tumor.

Lawrence G. Dunlap.

Wilson, R. P. **Fibroma of eyelid.** Giza Mem. Ophth. Lab., 1937, 12th ann. rept., p. 39.

A female aged 45 years had noted for two years a small hard lump in the lower left eyelid gradually increasing in size, painless, nonadherent to skin but adherent to the lower orbital margin, and causing a mechanical obstruction to vision. Pathologic sections showed the typical appearances of a soft fibroma. Lawrence G. Dunlap.

Wilson, R. P. **Lipoma of bulbar conjunctiva.** Giza Mem. Ophth. Lab., 1937, 12th ann. rept., p. 53.

A female aged eleven years had a soft yellowish rounded tumor, 4 by 4 by 3 mm., midway between the outer canthus and the temporal margin of the limbus, freely movable. It was found to be a lipoma of the bulbar conjunctiva. Lawrence G. Dunlap.

Wilson, R. P. **Malignant melanoma of eyelid.** Giza Mem. Ophth. Lab., 1937, 12th ann. rept., p. 42.

A female aged 27 years had noted three months previously a lump the size of a pea in her left upper eyelid. When examined she was found to have a large firm tumor of the middle third of the lid, about the size of a walnut,

not attached to the overlying skin, round, apparently cystic, and causing mechanical ptosis. There were enlarged glands in the parotid region and also in the neck. The tumor was found to be a typically malignant melanoma with secondary metastases to the glands.

Lawrence G. Dunlap.

Wilson, R. P. **Mixed tumor of lacrimal gland.** Giza Mem. Ophth. Lab., 1937, 12th ann. rept., p. 61.

Three cases were seen during the year. One, in a female aged 35 years, was of the "mixed salivary gland" type. One of six months duration, in a female aged 25 years, caused the eye to be displaced markedly downward and forward and restricted the eye movements. The third, in a female aged forty years, was of five years duration.

Lawrence G. Dunlap.

Wilson, R. P. **Neurofibroma of the eyelid.** Giza Mem. Ophth. Lab., 1937, 12th ann. rept., p. 40.

A female aged sixteen years, with a swelling over her left eye since birth, gradually enlarging, and with marked ptosis of the left upper lid, was found to have a typical neurofibroma.

Lawrence G. Dunlap.

Wilson, R. P. **Pigmented tumor of the optic-disc margin (melanoma).** Giza Mem. Ophth. Lab., 1937, 12th ann. rept., pp. 92-94.

A female aged 35 years complained of defective vision for the previous ten days, and was found to have a right optic disc almost completely obscured by a dense black globular mass about twice the diameter of the left disc. The first diagnosis was melanotic sarcoma, but when the patient refused operation and was examined a year later, the tumor had not altered either in size or appearance. There was no detached retina and vision was 2/60. The diagnosis was changed to benign melanoma.

Lawrence G. Dunlap.

Wilson, R. P. **Reticulum-cell sarcoma of lacrimal-sac region.** Giza Mem. Ophth. Lab., 1937, 12 ann. rept., p. 66.

A female aged 36 years, with a lump at the inner canthus of her left eye for the past three months, was thought to have a mucocele of the lacrimal sac, but at operation was found to have a solid tumor occupying the region of the sac. It was removed, but six weeks later there was a mass the size of a walnut at the site of the previous operation, with no glandular involvement. This was removed, and a month later the tumor had recurred, causing proptosis. Ten X-ray treatments were given, the swelling diminished, and six months later the patient was completely cured, but the optic disc was atrophic and vision nil.

A second similar case occurred in a male aged twelve years, in whom a lump had been noted in the region of the left lacrimal sac for the past six months. The tumor was fixed to the deeper tissues but not to the overlying skin. There was no glandular enlargement anywhere. The tumor was found to arise in the wall of the lacrimal sac. The patient could not be followed after removal of the tumor.

Lawrence G. Dunlap.

Wilson, R. P. **Sarcoma of limbus.** Giza Mem. Ophth. Lab., 1937, 12th ann. rept., p. 55.

A male aged fifty years had noted, two months previously, a small pale fleshy mass of the left eye at the limbal margin. It developed into a large fun-

gating tumor, covering the cornea and encroaching on the sclera, mushroom-shaped, about 1 cm. thick, and firmly attached by a broad base to the cornea and the nasal corneoscleral margin. It was friable and bled easily. Specimens were removed and the eye was afterward enucleated. The tumor was a myxosarcoma. Lawrence G. Dunlap.

16
INJURIES

Anguis, Tullio. **Ocular lesions from the juice of euphorbia (spurge).** Rassegna Ital. d'Ottal., 1938, v. 7, Sept.-Oct., pp. 649-660.

Euphorbia is an annual plant which blossoms in spring and summer, and occurs frequently in the Mediterranean basin. There are many varieties and they are known to the farmers as the "bad weeds." The juice and seeds of these plants are irritating, vesicant, purgative, and emetic. Thus they have many therapeutic uses. They have been reported to cause conjunctivitis, keratitis, and iridocyclitis. The author reports his experiments with fifteen rabbits, instilling the juice into the conjunctival sac. This regularly produced a conjunctivitis with increase of eosinophiles in the secretion, but no other lesions. Eugene M. Blake.

Block, H. M. **Ocular birth injuries of the new-born.** Texas State Jour. of Med., 1938, v. 34,May, p. 43.

Block lists and discusses many ocular birth injuries of the new-born.
Theodore M. Shapira.

Bogdonovich, I. I. **Changes in the blind spot of the uninjured eye in ocular traumatism.** Viestnik Opht., 1938, v. 13, pt. 4, p. 534.

The conclusion of the study is that in perforating ocular injuries and in intraocular foreign bodies the reflex changes in the uninjured eye do not include enlargement of the blind spot.
Ray K. Daily.

Bonnet and Bonamour. **"Chrysiasis": impregnation of the cornea by gold salts.** Bull. Soc. d'Opht. de Paris, 1937, Dec., p. 751.

Three more cases of deposition of gold in the cornea. Each had received gold-salt injections for pulmonary tuberculosis. Small granular deposits were noted in the corneal parenchyma immediately anterior to Descemet's. One case showed deposition in all layers. On account of the occurrence of a conjunctivitis in all cases, with limbal edema, and, in one case, outlining of a meshwork at the limbus by granules, the authors believe the lymphatics carry the gold granules into the cornea. Examination of patients receiving this treatment showed no deposition in those receiving less than three grams of the salt. Harmon Brunner.

Bonnet and Chauvire. **Circular rupture of the choroid from contusion of the globe.** Bull. Soc. d'Opht. de Paris, 1937, Dec., p. 749.

Observations on a patient seen nine days after an automobile accident. A circular vitreous opacity of a diameter greater than that of the lens was observed posterior to the lens. The edges were somewhat thicker, and were festooned and fringed with pigment. Through this diaphanous opacity, pigment granules were seen on the disc and retina, with the typical findings of commotio retinae. It is believed the hyaloid had been torn loose from its ciliary attachments. Similar findings had been observed in traumatic cases; the circu-

lar opacity usually disappearing on or about the ninth day.

Harmon Brunner.

Brodskii, B. S. **Ammonia burns of the eye and their treatment.** Viestnik Opht., 1938, v. 13, pt. 4, p. 565.

A laboratory study on rabbits. On its basis the author advises early intravenous administration of hypertonic salt solution in addition to local treatment in mild cases, or a Denig transplantation in severe cases.

Ray K. Daily.

Bujadoux, M. **Marking the anterior pole with lipiodol in ocular roentgenography.** Bull. Soc. d'Opht. de Paris, 1938, March, pp. 179-180.

By means of injection of lipiodol at the 12 and 6 o'clock positions at the limbus, foreign bodies may be accurately localized without other apparatus. The author emphasizes that thick lipiodol must be used, or it will spread. (Case report and X rays.)

Harmon Brunner.

Carter, T. J. **Electric welding, particularly eye hazards and protective measures.** U. S. Naval Med. Bull., 1939, v. 37, Jan., pp. 138-142.

Besides burns, electric shock, and inhalation of gases and dusts, the most important hazard of electric welding is injury to the ocular media and retina by the absorption of radiant energy. The rays emitted by the electric welding process include most of the ultraviolet, all of the visible rays, and most of the infrared rays. The conjunctiva and cornea absorb most of the ultraviolet, which gives rise to a severe conjunctivitis and keratitis. The chief cause of injury to the lens is the infrared, the heat of which may cause cataract. Visible light penetrates to the retina and may cause permanent retinal injury as in eclipse blindness. Adequate eye protection should be given in all occupations subject to such radiation. The use of green or black goggles is suggested.

T. E. Sanders.

Freedman, S. V. **The technique of intraocular foreign-body extraction with the magnet-solenoid.** Viestnik Opht., 1938, v. 12, pt. 4, p. 503.

This type of magnet permits of the simultaneous use of two magnetic applicators. This combination proved of advantage in extracting a foreign body entangled in the iris. By holding one magnet against the center of the cornea and the other in the wound at the limbus, the serrated foreign body was liberated from the iris and extracted. (Illustrations.) Ray K. Daily.

Genet. **Mustard gas, conjunctival ischemia, delayed corneal ulcer.** Bull. Soc. d'Opht. de Paris, 1937, July p. 409.

War injury by the gas occurred in 1918, and corneal ulceration in 1931 and 1937. White ischemic areas on the congested conjunctiva were considered as gas burns. The case aroused medico-legal interest. Harmon Brunner.

Lancaster, W. B. **The technique of extraction of intraocular foreign bodies.** Amer. Jour. Surg., 1938, v. 42, Oct., pp. 14-24.

This excellent article should be read by everyone doing industrial work. The newer methods of making the incision with the diathermy knife to prevent hemorrhage, and the use of diathermy needles around the incision to prevent retinal detachment, are discussed. (4 references.) Ralph W. Danielson.

Magitot and Dubois-Poulsen. **Localization of intraocular foreign bodies by**

scleral illumination. Bull. Soc. d'Opht. de Paris, 1937, Oct., pp. 621-626.

If the media permit, the quadrant containing the foreign body is determined. The scleral lamp is then passed beneath the conjunctiva, and the spot coinciding with the foreign body is marked. Incision is made at this point. The authors claim that trauma is avoided by the procedure.

Harmon Brunner.

Makarov, H. H. **Several cases of central retinitis caused by looking at a solar eclipse.** Viestnik Opht., 1938, v. 13, pt. 5, p. 692.

A report of four cases. In one case the injury resulted from one rapid glance at the sun; and in another it occurred in spite of the fact that the patient was wearing blue glasses. The latent period in such cases is much shorter than in cases of electric ophthalmia caused by exposure to the arc light; the scotoma in the visual field appearing after 10 to 15 minutes, while electric ophthalmia develops 6 to 8 hours after exposure. Ray K. Daily.

Malbran, Jorge. **Traumatic lesions of the iris; partial disappearance of the iris; total disappearance (irideremia).** Arch. de Oft. de Buenos Aires, 1938, v. 13, Aug., p. 431.

The author reports two cases of disappearance of the iris following trauma. In neither case was there a rupture of the globe. In the first case the disappearance, which followed a dynamite explosion, was partial, while in the second case, after a violent contusion of the globe, there was complete disappearance of the iris and lens. The author speculates upon the manner in which this phenomenon may arise and gives a summary of the literature.

Edward P. Burch.

Merkulov, K. I. **Ocular changes in cranial injuries.** Viestnik Opht., 1938, v. 12, pt. 4, p. 485.

In 52 injuries, the most frequent symptom of neurovisual involvement was a unilateral optic atrophy. Its direct cause is an injury in the region of the optic canal with subsequent strangulation of the nerve and hemorrhages into its membranes. Injury to the chiasm is rare and usually takes the form of lacerations. In all of the cases of traumatic optic atrophy fractures of the skull were found anteriorly, particularly in the frontal region. Lesions of the fundus were associated with injury to the bony structure of the face. The author believes a post-traumatic optic atrophy is diagnostic of a fracture of the skull. Ray K. Daily.

Mikhailova, M. H. **Penetration of six eyelashes into the anterior chamber.** Viestnik Opht., 1938, v. 13, pt. 4, p. 548.

In this unusual injury there was a small almost indistinguishable scleral perforation. Ray K. Daily.

Mitzkevich, L. D. **The penetration of eyelashes into the anterior chamber.** Viestnik Opht., 1938, v. 13, pt. 5, p. 694.

A report of a case, under observation for eight months, in which the presence of an eyelash in the anterior chamber produced no inflammatory symptoms.

Ray K. Daily.

Onfray, R., and Pirot, G. **Concerning localization of intraocular foreign bodies and their extraction.** Bull. Soc. d'Opht. de Paris, 1938, no. 2, Feb., p. 58.

A case is reported in which a magnetic foreign body was localized at the ora serrata. Attention is directed to the harm that may be done by using too strong a magnet, and so wounding the

structures as greatly as at the time of penetration. The advantage of a posterior route of removal is discussed.

Harmon Brunner.

Roche and Farnarier. **Prolonged tolerance of a large, unrecognized, intraocular fragment of copper.** Bull. Soc. d'Opht. de Paris, 1937, Dec., p. 739.

An atrophying globe which had recently become painful was removed and a piece of copper weighing 0.13 gm. was found. Ten years earlier the eye had been injured by a firearm explosion. No pain or sign of inflammation had been observed previously.

Harmon Brunner.

Sédan, Jean. **Extraction of lens containing foreign body for 42 years.** Bull. Soc. d'Opht. de Paris, 1938, March, p. 153.

Authenticated record of man blinded 42 years previously by metallic foreign body complicated by iridocyclitis. The extracted lens showed no general lenticular siderosis. An iron fragment was in a small pocket whose walls showed siderosis. (21 references.)

Harmon Brunner.

Sédan, Jean. **Partial cataract stationary for six years with foreign body "nailing" iris to lens.** Bull. Soc. d'Opht. de Paris, 1938, March, p. 160.

Case report of an eye tolerating a metallic foreign body, which had lacerated the iris and buried itself in the lens. The iris was plastered over the capsular wound. Partial cataract reduced vision to 0.7. The author reviews the literature and summarizes the usual influencing factors in similar cases: age and sclerosis of lens, peripheral site of entry, approximation of wound in capsule. Temporizing is advocated in such cases. (35 references.) Harmon Brunner.

Sverdlow, D. G., and Goldin, L. B. **Fracture of the superior maxilla complicated by fracture of the left frontal region, injury to the right optic canal, and total blindness of the right eye.** Viestnik Opht., 1938, v. 12, pt. 4, p. 515.

A description of severe injury in a student who was run over by a car. Two days after the injury, when the patient regained consciousness, he complained of total blindness in the right eye, and one month later optic atrophy had developed in the fundus.

Ray K. Daily.

Thies, Oscar. **Chemical burns of the eye.** Klin. M. f. Augenh., 1938, v. 101, Nov., p. 744.

Injuries of the cornea by bromacetone, war gas, acid vapors, and sulphuretted hydrogen are reported in which early transplantation of labial mucous membrane would have yielded better results. C. Zimmermann.

Veil, P., and Borsotti, I. **Experimental study of the extraction of magnetic foreign bodies from the vitreous of the rabbit.** Arch. d'Opht., etc., 1938, v. 2, Dec., p. 1077.

Magnetic pieces of a steel needle were introduced into the vitreous of rabbits, under aseptic conditions. The authors then attempted to remove the foreign bodies by the posterior route after an interval varying from two hours to fifteen days. They conclude that, while the rule of as rapid intervention after the injury as possible holds good, it does not give any operative prognosis. An early attempt at extraction may miscarry, while one performed later may succeed. Intraocular foreign bodies quickly entangle themselves in the ocular tissues. Extraction necessitates laborious maneuvers even in easy

cases. Small particles are more difficult to remove than larger older ones encapsulated in exudate. It is necessary to have a large and a small electromagnet. The latter facilitates removal of small particles which have first been freed by the large magnet.

Derrick Vail.

Yanes, T. R. **Industrial eye accidents.** Rev. Cubana de Oto-Neuro-Oft., 1938, v. 7, May-June, pp. 57-78.

This is a comprehensive treatise on the management of industrial eye injuries, with tables to calculate the percentage loss of vision, visual field, and ocular motility, and a formula to determine the total percentage disability. A fee schedule for various ophthalmologic services is also given. The author concludes by outlining a number of tests to unmask malingering.

Edward P. Burch.

17

SYSTEMIC DISEASES AND PARASITES

Black, W. B. **Ocular manifestations of allergy.** Surg. Gynecol. and Obstet., 1939, v. 68, Feb. 15, pp. 406-413.

The role played by allergy in the various ocular diseases is reviewed. Endocrine balance, metabolic and biochemical functions, vitamins, and heredity all play a part in the allergic patient's manifestations. T. E. Sanders.

Charlin, Carlos, **Essential facial neuralgia.** Ann. d'Ocul., 1938, v. 175, Dec., pp. 894-901.

In fifty cases of essential facial neuralgia treated with tuberculin there were 35 good, 8 mediocre, 7 bad results over a period of one year. One case is described. John M. McLean.

Goldberg, F. P. **Herpes zoster ophthalmicus.** Viestnik Opht., 1938, v. 12, pt. 4, p. 499.

A case involving the left eye developed three days after an acute infection of the throat. The ocular involvement began with an iritis. On the ninth day there appeared signs of keratitis. In the regressive stage of the keratitis two episcleritis nodules, adjacent to peripheral corneal infiltrations, developed at the limbus. There was reduced corneal sensitivity in the right eye.

Ray K. Daily.

Pautrier, L. M. **Ocular lesions in Besnier-Boeck-Schaumann disease; syndrome of Heerfordt.** Bull. Soc. Franç. d'Opht., 1938, v. 51, pp. 352-363.

The author notes the same microscopic picture in a number of conditions formerly thought to be distinct, but which he now considers to be related, and which he designates as a true reticulo-endotheliosis. These conditions are: (1) lupus pernio, first observed by Besnier; (2) multiple benign sarcoid, as described by Boeck; (3) benign lymphogranulomatosis, described by Schaumann, which involves the skin, lymph glands, lungs, bones and viscera, and is accompanied by diabetes insipidus; (4) the condition described under the name of "Heerfordt's syndrome," which consists of parotitis complicated by facial paralysis, iridocyclitis, and a skin eruption resembling sarcoid. The microscopic finding identical in all these conditions is an accumulation of epithelioid cells surrounded by round cells, without giant cells or tubercle bacilli. Clarence W. Rainey.

Shiga, Hidetoshi. **Histological study of the eyes of rabbits congenitally infected with syphilis.** Amer. Jour. Ophth., 1939, v. 22, Feb., pp. 119-129.

Toulant, P. **Ocular complications in malaria.** Acta Ophth. Orientalia, 1938, v. 1, Oct., p. 18.

Among the rare ocular affections due to malaria, dendritic keratitis accompanied by slight trigeminal neuralgia is most often encountered. The keratitis is due to affection of the ophthalmic nerve by the fever, for the plasmodium has never been found in the cornea. Other rare complications are: keratitis ulcerosa and punctata, chorioretinitis, paralysis of the ocular muscles, and transitory optic neuritis (distinguished by melanoid pigmentation on the disc).

R. Grunfeld.

Villiard, Bouniol, Vaillefont, and Fuentis. **Twenty-two cases of ocular leprosy.** Bull. Soc. d'Opht. de Paris, 1937, July, p. 348.

A colony of 32 lepers showed 22 with ocular lesions. The incidence of various lesions corresponds with the usual figures; with the exception of scleral lesions, which were few. Final results of intraocular surgery on these patients were invariably poor.

Harmon Brunner.

Werdenberg, E. **Principles of the knowledge and therapy of ocular tuberculosis.** Klin. M. f. Augenh., 1938, v. 100, Nov., p. 641.

This is a short synopsis on ocular tuberculosis from the clinical standpoint, based on experience with about 1,500 tuberculous eye patients. The chief types of ocular tuberculosis, the clinical picture, diagnosis, primary intrathoracic source, general tuberculous disease, diagnosis, and therapy are discussed, with special emphasis on the beneficial effect of high altitude. The author has discarded tuberculin tests and tuberculin treatment on account of the harm he has seen from all tuberculin preparations. C. Zimmermann.

Wilson, R. P. **Filariasis of the conjunctiva.** Giza Mem. Ophth. Lab., 1937, 12th ann. rept., p. 49.

A male aged seventeen years complained of "something like a serpent moving about in his left eye," noted that day for the first-time. A 10 cm. by 0.5 mm. single filiform cylindrical nematode, possibly F. bancrofti, was found moving under the bulbar conjunctiva, apparently trying to cross the corneoscleral margin to the cornea. Before the worm could be removed, it had migrated from the temporal to the nasal side of the globe and back again to the temporal side, from which position it was removed. Lawrence G. Dunlap.

18

HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Brewster, H. F. **Causes of blindness in Louisiana.** New Orleans Med. and Surg. Jour., 1938, v. 91, Oct., pp. 166-173.

The cause of blindness in seven hundred cases was determined, with syphilis causing 15.1 percent; glaucoma, 10.9 percent; congenital defects, 13.9 percent; and trauma, 4.9 percent. It was estimated that 73 percent of the cases were preventable, and factors of importance in conservation of vision are discussed. T. E. Sanders.

Cosmettatos, G. F., and Charamis, J. S. **The fight against trachoma in Greece.** Rev. Internat. du Trachome, 1938, v. 15, Oct., p. 149.

The antitrachomatous organization in Greece is described.

J. Wesley McKinney.

Fonseca, Aureliano. **Trachoma among the negroes in the state of São Paulo.** Rev. de Oft. de São Paulo, 1938, v. 6, Oct.-Nov.-Dec., pp. 195-197.

A brief statistical summary confirms the frequent statement that trachoma is rare in this race. The proportion was approximately of one negro case to one hundred white cases. W. H. Crisp.

Greeff, R. **What pictures of Albrecht von Graefe do we possess? 4. Graefe and Bowman.** Graefe's Arch., 1938, v. 139, pts. 4 and 5, pp. 587-590.

Two more portraits of Graefe are described and illustrated. One is that of a young man in his student days and the other a picture of Graefe standing with William Bowman.

H. D. Lamb.

Kreiker, A. **Blaskovics, L.** Ophthalmologica (formerly Zeit. f. Augenh.), 1938, v. 96, Nov., 9. 73.

An obituary.

Lijo Pavia, J. **Trachoma at the school age in Buenos Aires.** Rev. Oto-Neuro. Oft., 1938, v. 13, Sept., p. 201.

Eye examination of the children attending the primary schools of Buenos Aires revealed that of 300,000 children, 14,781 suffered from ocular disease, and 135 of these were diagnosed as having trachoma. As might be expected, the highest incidence of trachoma was in the more densely populated parts of the city. The methods employed to check the spread of trachoma are given.

Edward P. Burch.

Luckiesh, M., and Moss, F. K. **Contrast sensitivity as a criterion of visual efficiency at low brightness-levels.** Amer. Jour. Ophth., 1939, v. 22, March, pp. 274-276.

Masters, Robert. **Causes of blindness among the children at the Indian State School for the Blind.** Jour. Indiana State Med. Assoc., 1938, v. 31, Oct. 1, p. 537.

One hundred and eighty-seven students at the Indiana State School for the Blind are classified according to causes of blindness. Special comment is made concerning cases blind from causes usually considered preventable. These include ophthalmia neonatorum, 15 percent; prenatal syphilis, 12.3 percent; uveitis and its sequelae, 7 percent; and sympathetic ophthalmia, 3 cases.

George A. Filmer.

Musialova, Jadwiga. **The problem of blindness in Poland.** Klinika Oczna, 1938, v. 16, pt. 5, p. 631.

A review of the history of organized care of the blind and a detailed report of the various activities in this field in Poland. The institutions listed are asylums for the blind, schools for the blind, educational and vocational normal schools for the training of teachers, schools for the weak-sighted, and organizations for care of the adult blind and blind soldiers. Ray K. Daily.

Onfray, Lanet, and Bonhomme. **The Davidson test to measure stereopsis.** Bull. Soc. d'Opht. de Paris, 1937, July, p. 385.

Further studies on the Davidson test for stereopsis measurement (Amer. Jour. Ophth., 1935, v. 18, p. 356.)

Tests on army officers and clinic patients showed a 40-percent difference. The authors advise these simple tests for automobile drivers as well as aviators. (4 references.)

Harmon Brunner.

Skomoroch, Woldzimierz. **The activities of the antitrachomatous dispensaries in Wilka-Glusza.** Klinika Oczna, 1938, v. 16, pt. 5, p. 673.

An official and detailed report of the work in this district.

Ray K. Daily.

Turner, Harris. **Pensions for the blind in Canada.** Outlook for the Blind, 1938, v. 32, Dec., pp. 165-168.

A pension system for the blind was established in Canada during March, 1937. At present 3,959 receive pensions, about 38 percent of the total. The maximum pension is twenty dollars a month, with deductions if total income is over two hundred dollars. The definition of blindness is "having less than 10 percent vision." T. E. Sanders.

19

ANATOMY, EMBRYOLOGY, AND COMPARATIVE OPHTHALMOLOGY

Plitas, P. S. **The innervation of the motile structures of the eye.** Viestnik Opht., 1938, v. 13, pt. 5, p. 645.

The author stained the nerve network of the iris of rabbits in vitro, with a dilute solution of methylene blue. The behavior of the iris thus stained shows that its motions are accompanied by considerable alteration in form and position of the nerve fibers and their endings. The nerves running meridionally are twisted spirally in the dilated iris, and become elongated in the contracted iris. The stained nerves do not permit differentiation between motor, sensory, and sympathetic branches.

Ray K. Daily.

NEWS ITEMS

Edited by Dr. H. Rommel Hildreth
640 S. Kingshighway, Saint Louis

News items should reach the Editor by the twelfth of the month

Deaths

Dr. William Gray Ricker, Saint Johnsbury, Vermont, died February 28, 1939, aged 62 years.

Dr. Harry Stearns Willard, Patterson, New Jersey, died December 11, 1938, aged 62 years.

Dr. Walter Hamilton Snyder, Toledo, Ohio, died December 27, 1938, aged 68 years.

Miscellaneous

The staff of the Institute of Ophthalmology of the Columbia-Presbyterian Medical Center of New York City will sponsor a memorial volume of The Collected Papers of Dr. John M. Wheeler, the majority dealing with ophthalmic and plastic surgery. This book will be published in June. Anyone desiring to reserve one or more copies at the cost price of $4.00 per copy (postage prepaid) should send a check to the Library Committee, Institute of Ophthalmology, 635 West 165th Street, New York City.

The International Association for Prevention of Blindness, which maintains a secretariat in Paris, held its annual meeting in London on Wednesday, April 19, 1939. The principal topic for discussion was "The application of the Credé method for prevention of blindness in various countries." In the United States there has been a 75-percent reduction, during the past 30 years, in the number of cases of blindness from ophthalmia neonatorum. How this was accomplished was related at the international meeting by Dr. Conrad Berens of New York City, a member of the board of directors of the National Society for the Prevention of Blindness. America was represented also by Dr. Harry S. Gradle of Chicago, vice-president of the Illinois Society for the Prevention of Blindness, and Dr. Park Lewis of Buffalo, vice-president of both the International Association and the American National Society.

The American Foundation for the Blind is disseminating as widely as possible information regarding the Talking Book for the blind. This, as its name implies, is a phonographic disc which reads aloud any book which has been read into it. An average book can be recorded on 12 or 15 12-inch discs. One disc will read for approximately 30 minutes. Because of its particular construction for long-playing, the Talking Book cannot be used on an ordinary phonographic machine, but requires the Talking Book machine which was especially designed for it. The several models include machines with and without radios, electric and springdriven. Seven models are now available, and may be obtained from the American Foundation for the Blind, 15 West Sixteenth Street, New York City, which manufactures and sells them to blind people at cost. Prices range from $25.00 for a springdriven model to $120.00 for a console radio-phonograph combination. Price lists giving full information on all models will be sent on request. As many blind people are financially unable to buy these machines, a special grant has been made by the Federal Government for the manufacture of a large number of these instruments to be loaned to such blind people. Information regarding the borrowing of these may be obtained from the American Foundation for the Blind. The Talking Book records may be borrowed by blind people from the 27 regional distributing libraries throughout the country. Among the many Talking Books now available are such titles as "The lost horizon" by James Hilton; "Man of property" by John Galsworthy; "Man the unknown" by Alexis Carrel; "Madame Curie" by Eve Curie; "Snow White"; "Rumbin galleries" by Booth Tarkington; "Journey's end" by R. C. Sherriff; "Sweden, the middle way" by Marquis W. Childs.

Increased activities of the movement for protection of eyesight are reviewed by the National Society for the Prevention of Blindness in its anual report made public recently by Eleanor Brown Merrill, Executive Director. Explaining that its slogan, "Sight for tomorrow —for the world of tomorrow" was selected to conform with the theme of the New York World's Fair, the report adds: "This year, with the lure of things to see in abundance at the Golden Gate International Exposition in San Francisco and at the New York World's Fair, we are forcefully reminded how essential the sense of sight is to enjoyment as well as to work. It would be interesting to conjecture how many, of the thousands traveling eastward and westward, owe their blessing of sight today to those who thought of the world of tomorrow and the saving of sight for that world. The Society's first step, as a local committee in 1908, was an effort to ensure sight for tomorrow by preventing blindness at birth from the disease known as 'babies' sore eyes.' During the past 30 years, the campaign to eradicate this disease—ophthalmia neonatorum—has brought about a 75 percent reduction in the number of

infants who lose their sight at birth. This was accomplished because an organized program was carried on to save sight for tomorrow." The need to intensify the campaign against "babies' sore eyes" is pointed out by the National Society for the Prevention of Blindness. A slight increase in the incidence of ophthalmia neonatorum has been noted recently among boys and girls entering schools and classes for the blind. The latest figure shows an incidence of 7.4 percent as compared to the previous figure of 6.7 percent. Most states now have laws making it compulsory for doctors and midwives to use a prophylactic solution in the eyes of infants at birth as a precaution against this disease.

"The great strides which have been made recently in the campaign for the control of syphilis," the report says, "are of particular significance to the movement for protection of eyesight. Although it is a little early to note the effects of the campaign against syphilis, in so far as sight is concerned, ophthalmologists in one state visited by a representative of the Society commented that fewer cases of syphilitic eye involvements are coming to their attention. It is to be hoped that such reports will become increasingly frequent." Approximately 15 percent of all blindness can be traced to syphilis.

According to the report, sight-saving classes are now providing a normal education for approximately 8,000 American school children who have such seriously defective vision that they cannot be taught in the regular grades. The number of sight-saving classes has grown to 589, an increase of 31 over the year before. Because of the continuous need for specially trained teachers, the Society will participate in the giving of courses for the preparation of sight-saving-class teachers and supervisors at the 1939 summer sessions of the following institutions: Western Reserve University, Cleveland, Ohio; State Teachers College, Buffalo, New York; State Teachers College, Milwaukee, Wisconsin; University of California, Los Angeles, California; Wayne University, Detroit, Michigan.

Approximately 450,000 copies of the Society's pamphlets and 12,000 posters were distributed. A motion picture film, "Preventing blindness and saving sight," was shown to 1,500 audiences. Exhibit material was provided for 125 conventions, fairs, meetings, and so on. A transcribed radio program concerning the dangers to the eyesight of children from the use of fireworks on the Fourth of July was used by 200 stations.

The Society's income for 1938 was $126,000 and its expenditures amounted to $169,000, necessitating the use of $43,000 from its reserve fund. Financial support is received through voluntary contributions from 17,000 members and donors in all parts of the country.

Societies

The Association for Research in Ophthalmology, Inc., will hold its Tenth Scientific Meeting at the Coronado Hotel, Saint Louis, Missouri, on Tuesday, May 16, 1939. The following program will be presented:

1. Experimental ocular hypersensitivity, by T. E. Sanders, M.D., Department of Ophthalmology, Washington University, Saint Louis.

2. Studies on surface epithelium invasion of the anterior segment of the eye, by T. L. Terry, M.D., J. F. Chisholm, M.D., and A. L. Schonberg, M.D., Massachusetts Eye and Ear Infirmary, Boston.

3. A study of methemoglobin-producing organisms in ocular inflammations, by Maynard A. Wood, M.D., Department of Ophthalmology, University of Iowa, Iowa City.

4. The relation of Müller's orbital muscle to the pathology of retrobulbar tissues obtained in experimentally produced exophthalmos, by George K. Smelser, Ph.D., Department of Ophthalmology, Columbia University, New York.

5. Ocular reactions of horses and rabbits infected with strains of Brucella recovered from horses with periodic ophthalmia, by E. L. Burky, M.D., Robert Redvers Thompson, Ph.D., and Helen D. Zepp, A.B., The Johns Hopkins Hospital, Baltimore.

6. Staphylococcus conjunctivitis—experimental reproduction with staphylococci, by James H. Allen, M.D., Department of Ophthalmology, University of Iowa, Iowa City.

7. An immunological study of trachoma, by Louis Julianelle, Ph.D., Department of Ophthalmology, Washington University, Saint Louis.

8. Vitamin-D complex in myopia; etiology, pathology, and treatment, by Arthur A. Knapp, M.D., New York.

The Philadelphia County Medical Society Eye Section presented the following program on April 6, 1939: Posterior ethmoiditis with orbital involvement, by Dr. George W. Mackenzie; Compound prisms resolved and prescribed coincident to cylinder axes, by Dr. Sidney L. Olsho; Sketches on the early history of ametropia, by Dr. Burton Chance; Use of astigmatic dials, by Dr. John Matthews; Ophthalmic aspects of neuro-psychiatry as encountered in a state hospital service, by Dr. Samuel A. Zertsky.

The general assembly of the International Association for Prevention of Blindness was held in London, on Wednesday, April 19, 1939, at the House of the Royal Society of Medicine, 1 Wimpole Street, during the Congress of the Ophthalmological Society of the United Kingdom. The opening address was by Dr. P. Bailliart, chairman of the International Association for Prevention of Blindness. The discussion

of the Credé method for the prevention of ophthalmia neonatorum in various countries was opened by Dr. A. H. H. Sinclair (Edinburgh), and continued by Dr. R. P. Wilson (Egypt), Professor F. Terrien (France), Professor von Szily (Germany), Professor L. Maggiore (Italy), Dr. Conrad Berens (United States), and Professor Dr. A. Vasquez Berrière (Uruguay). A film on preventive measures against industrial eye injuries was shown. The printed reports will be distributed to the members of the Association and forwarded on request.

The annual congress of the Ophthalmological Society of Egypt took place at the Memorial Ophthalmic Laboratory, Giza, on March 24, 1939. The symposium for the congress was "Nonsuppurative keratitis."

Personals

Dr. John Dunnington and Dr. Phillips Thygeson have recently been appointed joint professors of ophthalmology of the Institute of Ophthalmology of the Presbyterian Hospital, New York: Dr. Dunnington as chief of the clinical branches of ophthalmology, and Dr. Thygeson as chief of research and teaching.

Dr. Louis Bothman announces the removal of his office from Peoples Gas Building, 122 South Michigan to Suite 1246—310 South Michigan Building. Practice limited to the eye.

Dr. Julian B. Marks announces the opening of his offices in the Beverly Medical Building, 415 North Camden Drive, Beverly Hills, California. Practice limited to eye, ear, nose, and throat.

Kalt, addressing the Société d'Ophtalmologie de Paris, at the recent celebration of its fiftieth anniversary, mentioned the fact that he was the only surviver of the founders of the Society.

Dr. H. L. Cunningham of Cape Girardeau, Missouri, was honored on April 10th at a dinner in celebration of his 50 years in the practice of medicine. Dr. F. E. Woodruff of Saint Louis was the guest speaker.

Dr. Everet H. Wood has opened his office at 120 Genesee Street, Auburn, New York, for the practice of ophthalmology. Dr. Wood has completed his residency training at the Long Island College Hospital. He had also held an appointment as clinical assistant at the Brooklyn Eye and Ear Hospital for 18 months. He also spent 1½ years as Fellow at the Long Island College of Medicine.

During the period of March 22d to March 25th, Drs. P. Chalmers Jameson and John N. Evans conducted intensive instruction courses in ophthalmology under the auspices of the Joint Committee on Graduate Education which includes the Medical Society of the County of Kings, Long Island College Hospital, and the Brooklyn Eye and Ear Hospital. Dr. Jameson's course covered operative technique of the extraocular muscles; Dr. Evans's, advanced instruction in visual field work. Both these courses were well attended, and it is probable that they will be repeated at a later date.

Dr. Walter Moore was recently made a surgeon at the Brooklyn Eye and Ear Hospital, to occupy the position previously held by Dr. James Andrew, who died a few months ago.

Dr. Charles Rosenthal has recently been appointed clinical assistant under Dr. Evans at the Brooklyn Eye and Ear Hospital.

The Brooklyn chapter of the American College of Surgeons visited the Department of Surgery at the University of Rochester, New York, on March 11th. This group included a unit composed of the following ophthalmologists: Drs. Walter Moore, Charles A. Hargitt, P. Chalmers Jameson, William F. Steinbugler, and John N. Evans.

Dr. Jonas Friedenwald presented a paper before the Pediatric Section of the Medical Society of the County of Kings in Brooklyn on February 15th. His subject was "The vitamin problem in the domain of ophthalmology."

Drs. Charles R. Hopkins and Harold Schilback have recently been appointed to a special committee for the New York Board of Education to investigate the general problem of sight-conservation classes as they now exist in schools.